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Teachers have a strong impact on their students' learning such that a student receiving instruction by an incompetent teacher, even for one school year, might endure long-term negative consequences. Several studies found how teacher knowledge and instructional practices are strong predictors of students' successful learning. In the center of teacher knowledge is teacher content knowledge, which for reading includes knowledge of basic language elements. The findings from most of the studies that addressed teacher language knowledge are mounting to indicate that teachers have poor language knowledge and suggest this is problematic due to the language knowledge necessary for learning to read.

This study aimed to examine Arabic language knowledge among Saudi elementary special and general education teachers who teach reading to students with reading disabilities. This study utilized an explanatory sequential mixed methods design, with two phases. A quantitative phase examined the knowledge of Arabic Morphology and Phonology (KAMP) and the self-perception of language knowledge among 263 teachers, and a qualitative phase of interviews with a selected number of special education teachers.

The findings from this study indicated that special and general education teachers have poor knowledge of Arabic phonology and morphology, with a tendency to overestimate their levels of language knowledge. Also, teachers with little teaching experience scored significantly higher than teachers with average and high teaching

experience, indicating that teachers' amount of teaching does not improve their language knowledge. The interviews suggest an unfamiliarity with aspects of Arabic language knowledge may be due to limited or no attention to it in teacher preparation and in-service training programs, the main factor considered for the noticed poor language knowledge. The study concludes with the discussion of the findings, possible implications, study limitations, and suggestions for future research.

ARABIC LANGUAGE KNOWLEDGE AMONG EARLY ELEMENTARY SAUDI
TEACHERS OF STUDENTS WITH READING DISABILITIES:
A MIXED METHOD STUDY

by

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Approved by

Committee Chair

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I want to dedicate this work to my parents, Reffah and Fehaid, to my wife, Badriah,
and to my kids, Fahad, Ghala, and Talal

APPROVAL PAGE

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CHAPTER I

INTRODUCTION

Education is an empowering tool, which developing countries (Bridgeland, Wulsin, & McNaught, 2009) and minorities (Langton & Ma Rhea, 2009) perceive now as a vehicle for more prosperity, and improving the well-being of citizens. It is an investment in the future, which makes it a topic of heated discussion, in both political and social arena, and a target of continuous amendments and legislative acts.

In Saudi Arabia, improving education for all students, including students with special needs, is a significant state obligation. Building a strong and productive society through investing in the family's prosperity and providing meaningful education are stated as major goals in the new Saudi Vision of 2030 (Saudi Vision 2030, 2016). Therefore, around 20% of the total Saudi yearly expenditure, between the years 2009 and 2019, was directed toward education; still, the country is planning to spend 19% of its 2020 budget (193 billion riyals; Ministry of Finance, 2019). Thus, it is fair to indicate that Saudi Arabia is among the top in governmental spending on education (UNESCO Institute for Statistics, 2007). Also, see Table 1.

Table 1

Percentage and Amount of Saudi Spending on its Education in the Last 10 Years

Year	Expenditure (in Billions)	Education (in Billions)	%
2010	654	137.6	21.03
2011	827	150	18.13
2012	873	168.6	19.31
2013	976	204	20.90
2014	1110	210	18.91
2015	978	217	22.18
2016	825	191.7	23.23
2017	926	207	22.35
2018	978	209	21.37
2019	1106	193.5	17.49
Average	925.3	188.8	20.49

Despite this huge focus on education, Saudi students continue to have poor performance on international tests, such as the Progress in International Reading Literacy Study (PIRLS), the Trends in International Mathematics and Science Study (TIMSS), or the Program for International Students Assessment (PISA). The first time Saudi students were involved in these types of tests was in 2011 when they participated in the PIRLS. Back then, Saudi students achieved a score of 430, the PIRLS' center-point was 500. The majority of the students (65%) were considered low performers (Mullis, Martin, Foy, & Arora, 2012). In 2016, Saudi students participated again in PIRLS and achieved the same score (430), ranking 44 on a list of 50 countries (Mullis, Martin, Foy, & Hooper, 2017). Another international test was the TIMSS, which auspices under the International Association for the Evaluation of Educational Achievement (IEA), addresses math and science for fourth- and eighth-graders. In 2015, Saudi students continued to achieve below average, as fourth-graders scored 383 in mathematics and 390 in science, and

eighth graders scored 368 in mathematics and 396 in science (Mullis, Martin, Foy, & Hooper, 2016). These results were also mirrored in recent participation in PISA 2018. The PISA is managed by the Organization for Economic Co-operation and Development (OECD), and test 15-year old students in mathematics, science, and reading. It was the first time for Saudi Arabia to participate in PISA; however, students scored below the average on all the tested domains, 399 in Reading, 373 in Mathematics, and 386 in Science, while the OECD averages were 487, 489, and 489, respectively (OECD, 2018).

Teachers and Quality of Education

This low performance by Saudi students at these different tests and across subjects is surprising since the country seems to value the importance of education at the policy and government spending levels. Nonetheless, the country's spending on education is crucial; however, it not the only factor for ensuring the quality of education. Among other factors believed to have a substantial impact on the quality of education, providing students with highly qualified teachers is considered essential; teachers have a huge influence on their students' achievement (Hattie, 2008; Reutzel et al., 2011). Numerous studies have reported how teachers' knowledge and instructional skills are strong predictors of students' learning (e.g., Darling-Hammond & Youngs, 2002; McCombes-Tolis & Feinn, 2008; Piasta, Connor, Fishman, & Morrison, 2009). Teachers' impact on students' outcomes is mediated through their knowledge and teaching skills (McCombes-Tolis & Feinn, 2008); so, the impact is significant. The impact is profound to the extent that receiving instruction by incompetent teachers for even one year might result in a long-term negative impact on students' learning (Reid Lyon & Weiser, 2009). This should

not be surprising, knowing that teachers plan and deliver instruction, facilitate students' learning, provide support when needed, and monitor the whole learning process, ensuring the quality of their instruction and the learning of their students. If teachers do not understand what they teach or do not know how to teach it well, they will not be able to provide their students the support they need (Ball, Thames, & Phelps, 2008).

Typology of Teacher Knowledge

Following Shulman's (1986) seminal work on teacher education, the literature differentiates between three types of teacher knowledge—content knowledge, pedagogical knowledge, and pedagogical content knowledge. *Content knowledge* refers to knowing the basic concepts and facts related to the subject matter (e.g., mathematics, physics, reading), as well as understanding the process that governs how the basic facts are established (Soodla, Jõgi, & Kikas, 2017). For example, in reading, there are two main genres, fiction and non-fiction, and teachers need to know what each means, as well as the distinctive features of each. *Pedagogical content knowledge* requires knowing how to teach students basic concepts and facts (Soodla et al., 2017). For instance, the reading teacher should understand how to teach students to differentiate between fiction and non-fiction materials to gain meaning, using specific teaching strategies that allow students to maximize their reading understanding. Therefore, pedagogical content knowledge is also suggested to include knowing students' characteristics and how they learn (Shulman, 1986). Teachers' methods of teaching fiction and non-fiction texts would differ based on students' developmental age, reading ability, learning stage, interest, motivation, and background knowledge, to name just a few. Third, *pedagogical knowledge* refers to

familiarity with the general teaching resources, materials, and instructional tools, as well as teaching programs that can be consulted when teaching specific-content knowledge (Shulman, 1986). Effective teachers know different ways of planning and presenting information, monitoring students' learning, evaluating the efficacy of instruction, as well as building effective classroom environments and classroom activities.

All three types of knowledge (i.e., content-specific knowledge, pedagogical knowledge, and content-pedagogical knowledge) are essential in order for teachers to deliver instruction effectively, and lacking any type would have a serious impact on students' learning, lowering their chances to develop into productive, independent community members. Therefore, these three types of teacher knowledge were and still are the target of descriptive and experimental research, seeking to understand the state of teacher knowledge, factors that impact the quality of teacher knowledge, and possible ways to enhance it (Cunningham, Perry, Stanovich, & Stanovich, 2004).

Reading Content Knowledge

In comparison to pedagogical knowledge and content-pedagogical knowledge, content knowledge of reading is only recently targeted with more research (Washburn, Mulcahy, Musante, & Joshi, 2017). This late consideration might be attributed to the increasing attention on students' low literacy achievement, encouraging researchers and policymakers to examine factors contributing to this unfortunate outcome. However, it might also be attributed to the difficulty associated with how to define the parameters of reading content knowledge. In fact, unlike mathematics, science, and social studies, defining reading content-knowledge is very challenging (Cunningham et al., 2004).

Reading is an activity that underlines much of the learning process, and thus, all teachers, regardless of their areas of content, are expected to possess sufficient knowledge of reading and its processes (Alvermann, Friese, Beckmann, & Rezak, 2011).

According to Spear-Swerling and Brucker (2003), teachers' reading-content knowledge constitutes the knowledge of language structure. Reading teachers must have knowledge of and the ability to perform tasks related to essential language elements such as phonemic awareness, phonics, and vocabulary (Cunningham, Zibulsky, & Callahan, 2009). The legitimacy of these skills is based on the findings from the report published by the National Reading Panel (2000), hereafter referred to as NRP, that emphasized the importance of explicit instruction on phonemic awareness, fluency, vocabulary, and comprehension for enhancing students' reading abilities. For reading teachers to deliver effective explicit instruction targeting these domains, they must possess sufficient language knowledge.

Moats (1999), as well as Phelps and Schilling (2004), suggested that besides knowledge of language structure, teachers need to know the reading text. Knowledge of the reading text includes text genre and text readability (Snow, 2002). Reading teachers should know that there are different types of texts (e.g., literary, informational) with different complexity levels; and that assigning a reading passage requires matching the characteristics of the text to that of the reader, such as background knowledge, reading abilities, and reading motivation.

Besides the ambiguity associated with defining reading content knowledge, there is also the *Peter Effect* on education. This assumption is built upon the belief that reading

teachers with high levels of reading proficiency, engagement, and enthusiasm can make good reading teachers (Applegate & Applegate, 2004; Applegate et al., 2014). It is based on the assumption that if they know it well, they can teach it well. However, numerous research studies concluded that reading teachers lack the knowledge of basic language structure and the text structure (McCutchen, Harry, et al., 2002; McIntyre & Hellsten, 2004; Moats, 1994; Piasta et al., 2009; Podhajski, Mather, Nathan, & Sammons, 2009; Spear-Swerling & Brucker, 2003). This finding was reported for general and special education classroom teachers and for in- and pre-service teachers alike. This finding is not limited to only teachers in the United States, as evidence from other English and non-English speaking countries suggests a similar conclusion (e.g., Alatalo, 2016; Aro & Björn, 2016; Chapman, Greaney, Arrow, & Tunmer, 2018).

Concerning Saudi Arabia, a comprehensive review of literature related to teacher education, special education, and reading education, indicated a severe lack of research related to teachers' reading content knowledge.¹ At the same time, public reports on teachers' performance on subject-matter related exams indicated that more than 50% of teachers applying to school teaching positions in 2016 failed to pass (Saudi Press Agency, 2016). It should be noted that it is only recently that the ministry of education introduced the requirement of passing a certifying exam before entering school settings. The majority of teachers teaching in schools joined before the Ministry of Education began introducing the exam-based hiring initiative.

¹ This observation is supported by a reexamination of the studies reviewed in Fehaid et al. (2019), which targeted special education publications from Saudi Arabia between 1984 – 2016.

Statement of the Problem

Reading is a very important skill to acquire. Knowing how to read impacts the chances of success inside and outside school (Fuchs et al., 2002). Through reading, students learn about math, science, and technology, and interact with a world beyond their reach, acquiring new knowledge and valuable experiences. Therefore, failing to acquire reading skills might have devastating consequences. Hernandez (2011) conducted a longitudinal study that compared graduation rates among poor and proficient readers in the United States, indicating that the percentage of poor readers who failed to finish high school is significantly higher than that of the proficient readers, 23% and 4%, respectively. This is alarming when knowing that only one-third of American students in fourth and eighth grade are reading at or above the proficiency level, it is only 10% among students with special needs (The National Assessment of Educational Progress, 2019).

In this regard, students in Saudi Arabia are not an exception. Findings from international tests on reading show how our students are performing poorly, in comparison with students from other nations. Also, reports on students receiving special education services highlight how the significant percentage of students receiving special education services are students with reading disabilities (RDs). Alkhashrami (2004) reported 40% of students with special needs in Saudi Arabia are students with learning disabilities (LDs), and Al-Sartawi (1996) noted that 60-70% of students identified with LDs are students with RDs. These two facts, taken together, are alarming signals for Saudi educators and stakeholders to address what seems to be a reading crisis.

If students are to become proficient readers, they must be competent in using and understanding language (McIntyre & Hellsten, 2004). Students with RDs are prescribed with poor language processing (Moats, 1994). Most of the students identified with RDs exhibit difficulty in reading words accurately and fluently (Adams, 1994). Therefore, for students with RDs to receive useful and meaningful reading instruction, it must be ensured that knowledgeable and skillful reading teachers served them. Reading teachers must possess sufficient knowledge of basic language structure and awareness of factors that impact students' reading. Unfortunately, while correlational studies show how strong the relationship is between teachers' reading-content knowledge and students' reading performance, studies on teachers' reading-content knowledge across different countries (e.g., U.S., UK, Canada, Australia, Sweden, and Finland) reported how teachers lack the content knowledge necessary to deliver effective reading instruction. Studies showed that teachers failed to define essential reading terminologies or language structures (e.g., phonemic awareness, morphemes, phonemes), count the number of sounds and the number of syllables in words, identify the number of morphemes, or link reading titles to their relevant grade level, all of which are indicators of poor reading content knowledge essential for planning and implementing effective reading instruction. Additionally, a review of the literature on Saudi special education publications indicated the absence of studies on teachers' reading content knowledge (Fehaid, Alshuayl, & Ryndak, 2019). Also, a personal review of the literature related to elementary education, for this dissertation, led to a similar conclusion.

Therefore, research on Saudi teachers' reading content knowledge is timely and needed for providing literature on teachers' reading content knowledge. Knowing Saudi teachers' levels of Arabic language knowledge is essential for increasing our students' likelihood of successful learning outcomes. It is important for policymakers, within teacher training and preparation programs, to become aware of how reading teachers function related to these domains if these programs to be responsive and produce effective and impactful teachers. It becomes necessary when any quality indicators are absent in the educational system, or when its quality is questioned and characterized by a lack of necessary educational services and unqualified teachers (Rabaah, Doaa, & Asma, 2016).

Statement of Purpose and Research Questions

This dissertation adopted an explanatory sequential mixed method design to examine the knowledge of Arabic morphology and phonology (KAMP), as well as the perception of language knowledge and its role in reading among Saudi general and special education teachers teaching reading to early elementary grade students with RDs. The study sought to answer the following questions:

1. What is the difference between special and general classroom teachers on their knowledge of Arabic morphology and phonology as depicted by the KAMP?
2. What is the difference between special and general classroom teachers in terms of how they perceive their knowledge of Arabic morphology and phonology?

3. What is the difference between general and special education teachers on their knowledge of Arabic morphology and phonology, as measured by the KAMP, based on their level of teaching experience?
4. How do special education teachers describe the role of language knowledge in the learning of reading for their students, and do their described instructional practices reflect an appreciation of this role?

Significance of the Study

This study has two major contributions. First, systematic reviews of the literature related to special education and early elementary education in Saudi Arabia indicated an absence of studies that address teachers' knowledge of Arabic morphology and phonology. Acknowledgment of the importance of this type of knowledge to the teaching of reading to students, especially students with RDs, highlights the need for examining special and general classroom teachers on their understanding of these basic elements of the Arabic language. Therefore, this study is the first to address this topic, hopefully increasing the awareness of the centrality of language knowledge to the ability to read, and thereby making teacher training and preparation programs more sensitive to this fact.

The second contribution is related to the use of a mixed methods design. Two facts should be emphasized in this regard. A review of Saudi special education research, published between 1984 and 2016 (Fehaid, Alshuayl, & Ryndak, 2019), indicated that mixed methods research is rarely used by researchers (only 0.6%). Additionally, the general literature related to special and general classroom teachers' knowledge of basic language elements across countries as well as languages showed how researchers use

only quantitative methods. The consensus on the field is now building toward establishing the fact that reading teachers, both pre- and in-service, lack the necessary language knowledge to teach reading. It might be time now that the field moves forward to address why teachers continue to show poor language knowledge, and the possible ways to make positive changes. Accordingly, this dissertation is unique because it uses a combination of quantitative and qualitative methods, as well as for pursuing a topic that has yet to be addressed with Saudi general and special education teachers of students with RDs.

Chapter Summary

This chapter stated how investment in education is considered by developing countries, including Saudi Arabia, as a way to increase prosperity. Saudi Arabia is leading its neighboring countries in terms of investment in education. However, ensuring the quality of education requires further consideration of teachers' teaching knowledge and skills. For its focus on reading and education of students with RDs, this chapter discussed the parameters of teachers' reading knowledge, indicating how the literature differentiates between content knowledge, pedagogical knowledge, and pedagogical content knowledge. This dissertation addressed teachers' reading content knowledge, namely the knowledge of Arabic morphology and phonology. There are limited to no studies that address this particular area of research within the Saudi Arabia context, which makes this study timely and needed.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter presents the literature on teachers' basic language knowledge, as well as on special education in Saudi Arabia. It includes sections that define reading in light of the simple view of reading, discuss the role of language in reading, and explain the role of teachers in children's acquisition of reading; other sections addressed the importance of teachers' language knowledge and the methods used to assess this type of knowledge, along with a detailed report on the findings from previous research studies related to teachers' knowledge of basic language elements. Finally, the chapter concludes with a section related to the context of the study (Saudi Arabia), explaining the country's history, educational backgrounds, special education services, and special education research, with particular emphasis on reading disabilities.

The Simple View of Reading

The reading phenomenon is a very interesting and important topic to study. It is probably the most essential and first intellectual activity we learn to acquire when we enter school. Therefore, it was and still is a subject for theoretical and experimental research—research that aims at understanding its process and its product. A prominent reading theory in the literature is the simple view of reading (SVR; Gough & Tunmer, 1986; Hoover & Gough, 1990). SVR recognizes reading comprehension as the product of the reading process that is built on listening comprehension and decoding using the

famous equation “ $R = D \times C$.” The theory highlights two important claims; *first*, listening comprehension and decoding are equally important and neither is sufficient by itself for accomplishing successful reading; and *second*, the two elements are independent and can be performed in isolation. This is evidenced by the fact that some individuals cannot read and still understand speech in normal conversations, or others who read fluently and yet still fail to build a cohesive mental representation of what they read (Fletcher, Lyon, Fuchs, & Barnes, 2006; Gough & Tunmer, 1986).

Several studies that investigated SVR’s underlying principles reported confirming findings (e.g., Catts, Hogan, & Adlof, 2005; de Jong & van der Leij, 2002; Hoover & Gough, 1990). Their findings indicated how decoding abilities and listening comprehension counted for most of the variance in students’ reading performance (e.g., Catts et al., 2005; Hoover & Gough, 1990; Language and Reading Research Consortium, 2015; Lonigan, Burgess, & Schatschneider, 2018; Tilstra, McMaster, Van den Broek, Kendeou, & Rapp, 2009). Hoover and Gough (1990) reported that decoding and listening comprehension counted for at least 71% of the variance in students’ performance at first, second, and third grades. In the study by Tilstra et al. (2009), the variance ranged between 40-60% across fourth, seventh, and ninth graders. In a more recent study, Lonigan et al. (2018) indicated that among third-, fourth-, and fifth-graders, language knowledge and decoding ability accounted for more than 94% of the variance.

Noteworthy, studies indicated that decoding accounts for most of the variance in reading performance during early elementary grades, with its influence decreasing as students progress to upper grades in favor of listening comprehension. For example, Catts

et al. (2005) conducted a longitudinal study that examined students' reading performance at second, fourth, and eighth grades, reporting findings that indicated a decreasing influence for decoding ability (from 27% to only 2%) associated with an increasing influence for listening comprehension (from 9% to 36%), as students proceeded to upper grades. Tilstra et al. (2009) reported a similar conclusion indicating a decrease in the influence of decoding (from 42% to only 13%), accompanied by the increasing influence of listening comprehension (from 19% to 35%) when students progressed from fourth grade to seventh grade.

The overall conclusion from these studies is that the reading process is mostly governed by two essential language-based abilities, the ability to decode written words fluently and accurately, and the ability to understand the meanings conveyed by a spoken message. Also, these two abilities influence the reading process differently and have different impacts as students advance through grades, and that both are important for successful reading performance.

The SVR is also highly regarded for explaining how students exhibit reading problems (Catts, 2018; Catts, Adlof, & Weismer, 2006). SVR's notion of distinguishing listening comprehension and decoding, as elements that enable the reading comprehension, provided the ground for a way to define reading disabilities. Accordingly, poor reading is suggested to result from adequate decoding skills but poor listening comprehension, adequate listening comprehension but poor decoding, or poor decoding skills and poor listening comprehension (Gough & Tunmer, 1986; Hoover & Gough, 1990). Defining reading comprehension as the product of the reading process, and listing

comprehension as an element of that process is of particular interest. Listening comprehension and reading comprehension are similar in their reliance on language, but different on the means they use to access the conveyed messages. For listening or reading comprehension to be successful, a certain level of language competency must be present to allow for accessing the lexical knowledge encompassed by the utterances or words. However, unlike listening comprehension, reading comprehension is constrained by its dependency on the ability to decode words, which makes it harder.

In concept, this notion from SVR would help to identify students' reading needs effectively. When failing to perform the reading task, the readers' ability to decode and understand language might be questioned, and appropriate instruction can be provided. However, if the reader continues failing to understand the passage, despite possessing sufficient language knowledge and decoding ability, the knowledge of effective reading strategies can then be questioned and targeted with different reading instruction. Therefore, the *Simple View* does not suggest simplifying the reading process; instead, it aims at simplifying its conceptualization, assessment, and teaching (Hoover & Gough, 1990). However, understanding the basics of the SVR, and consequently the reading process, requires an understanding of the central role language knowledge plays in reading.

Language Knowledge and Reading

The language construct includes components related to its form (phonology, morphology, syntax), content (semantic), and use (pragmatics); all are necessary for producing and understanding written and spoken language (American Speech-Language-

Hearing Association, 1983; Fedora, 2014; Kamhi & Catts, 2011; Mercer, Mercer, & Pullen, 2010). In their model for assessment of language ability, Bachman and Palmer (1996) included these five components and placed language knowledge at the center. Also, when the International Dyslexia Association (2010) issued the *Knowledge and Practice Standards for Teachers of Reading*, it emphasized providing instructional practices that address language knowledge components. Therefore, knowledge of basic language elements is expected and should be placed at the heart of any reading instruction; more importantly, any reading teacher training or preparation programs. Sections devoted to defining components of language knowledge, explaining how language knowledge impacts reading acquisition, and interpreting the role of language knowledge on developing reading disabilities follow.

Components of Language Knowledge

Phonology is “the aspect of language concerned with the rules that govern the distribution and sequencing of speech sounds” (Kamhi & Catts, 2011, p. 2). It includes both the knowledge of letter-sound relations and phonemic awareness. The letter-sound/graphophonemic knowledge constitutes knowing the identical sound each letter or group of letters make (Bursuck & Damer, 2010). In this sense, English has 26 letters that make 44 different sounds, and Arabic has 28 letters that make 128 different sounds. Phonemic awareness, on the other hand, refers to the ability to manipulate the smallest unit of sound (de Jong & van der Leij, 2002); such activities that might be used when teaching or testing phonemic awareness include blending and segmentation (Bursuck & Damer, 2010). Phonemic awareness is essential for developing reading and writing skills

(Goswami, 2002). *Morphology* refers to the smallest unit of meaning in the language, such as prefixes, suffixes, and word roots (Casalis, Colé, & Sopo, 2004). Word roots (e.g., teach, car, pen) are free/stand-alone morphemes, while suffixes and prefixes (e.g., er, ed, un) are bound/non-stand-alone morphemes (Mercer et al., 2010). The morphologic knowledge requires awareness of how words are constructed from small units of meaning, as well as knowledge of how these units are sounded out and what each means (Kuo & Anderson, 2006). Therefore, it is central for decoding and extracting meaning from words, and thus it has a huge impact on reading fluency and reading comprehension (Kieffer, 2014). *Semantic* knowledge refers to words meaning in isolation and combined; thus, there is lexical semantic knowledge indicating the meaning of individual words and relational semantic knowledge indicating the meaning of a word related to other words in the sentence (Kamhi & Catts, 2011). *Syntax* relates to rules that govern how words are structured into sentences (Mercer & Pullen, 2008). Sentences formed incorrectly may impact the understanding process at the macro and micro levels of the text. This is why direct instruction on syntactic knowledge was found to enhance the reading comprehension of students with reading disabilities (Kuder, 1991). Finally, *Pragmatics* refers to how the language is used within the social and cultural contexts (Bachman & Palmer, 1996). Awareness about the language context, in reading or communication, is essential for successful comprehension of the embedded message. Lack of this knowledge leads to language incompetency and possible failures in communicative situations.

Language Components and Reading Acquisition

Student's ability to read with understanding is significantly impacted by their linguistic knowledge (Kamhi & Catts, 2011; Mason, 1979; Nation, 2005; Roth, Speece, & Cooper, 2002). Successful interaction between elements of language comprehension (i.e., linguistic knowledge, background knowledge) and decoding ability (cipher knowledge, lexical knowledge) leads to successful comprehension of the reading text (Wren, 2000). *Linguistic knowledge* constitutes knowledge of language form and content, namely phonology, morphology, semantics, and syntax. *Background knowledge* refers to knowledge of the world (van Gelderen et al., 2004), knowledge that shapes the message subject of delivery or realization during communicative events; thus, multiple models of reading comprehension state background knowledge as a force leading and facilitating the process of creating an optimal mental representation of the text (Kintsch, 1998a; Nassaji, 2007). *Cipher knowledge* refers to the knowledge of letter-sound relations, which is transparent for some languages and not for others; it is the knowledge that allows for sounding out new regular words (Wren, 2000). *Lexical knowledge*, on the other hand, is related to sounding out irregular words (e.g., night, two, nice), which requires more specific knowledge. Sufficient proficiency levels on the cipher and lexical knowledge are necessary for reading words at an appropriate speed, enough for the working memory to be focused on the comprehension process. However, in turn, optimal cipher and lexical knowledge require a strong knowledge of language content and form; background knowledge plays a vital role via the storing and reusing of learned linguistic information

and application when acquiring new knowledge. This is how decoding and language comprehension work jointly to allow for successful reading comprehension.

When learning to read, the child develops the knowledge that words are made up of sounds (represented by letters) and develop the ability to segment and blend sounds in words (Byrne & Fielding-Barnsley, 1989). Alphabetic knowledge is a prerequisite for phonemic awareness (Johnston, Anderson, & Holligan, 1996), and both are necessary for phonological processing and the development of good reading skills (Adams, 1994; Catts, Fey, Tomblin, & Zhang, 2002). The phonological memory, an essential component of the phonological processing, stores and organizes linguistic units, enhancing the quality and speed of the reading process. When the reader reaches a sufficient level of automatic word recognition, the need for breaking words into phonemes decreased, and the orthographic information, or reading words by sight, becomes permanent, given an increased importance to semantic memory (Kamhi & Catts, 2011). After that, when reading, the readers build a mental representation of the text, using the information within the text (text-base), as well as information outside the text stored in the background knowledge (situational-base). According to Construction-Integration (Kintsch, 1998b), the comprehension process is achieved through two main phases: a construction phase, during which the linguistic inputs along with the background knowledge are used to construct a text-based understanding; and an integration phase, during which the text base understanding is integrated into a more general and consistent view. From this, it is evident how language knowledge plays a central role in determining the success of the

reading process. Students need to possess sufficient language knowledge (e.g., phonology, orthography, morphology) in order to be successful readers.

Language Components and Reading Disabilities

Evident by the integral role language knowledge have in the reading process, reading disability is recognized as a language-related dysfunction that is neurobiological in origin (Davidson, 2013; Hudson, High, & Al Otaiba, 2007). Studies that compared the brain structure for students with and without reading disabilities found differences in brain areas related to language processing (e.g., Bailey, Hoefft, Aboud, & Cutting, 2016; Booth & Burman, 2001; Ferstl, Neumann, Bogler, & Cramon, 2008). Sufficient language ability is essential for successful processing and production of speech and text.

Consequently, the language ability was the center for definitions that aimed at defining the aspects of reading disabilities such as the simple view of reading (Gough & Tunmer, 1986), the Individuals with Disabilities Education Improvement Act (2004), or the International Dyslexia Association (2010). Gough and Tunmer (1986) differentiated between three types of reading disabilities with respect to the ability to decode and understand language. In their taxonomy, reading disabilities may take the form of dyslexia (poor decoding ability and good comprehension), hyperlexia (good decoding and poor comprehension), or garden variety (poor decoding and poor comprehension). Kamhi and Catts (2011) adopted the same taxonomy when discussing the role of language in the ability to read.

However, it should be noted that some researchers expressed their doubts about this typology and tended to interpret all reading disabilities as dyslexia (e.g., Bar-Kochva

& Amiel, 2016) to the point that some perceive the two terminologies as synonymous (e.g., Hudson et al., 2007; Snow, Burns, & Griffin, 1998). This different view of reading disabilities might be empowered by the fact that the majority of students identified with specific learning disabilities (80%) experience an inability to decode words accurately and fluently (Shaywitz, 1998). Nevertheless, this view is challenged by a body of research that documented strong evidence supporting the existence of the taxonomy of reading disabilities (Biancarosa & Snow, 2004; Kintsch, 1998a; Lauterbach, Park, & Lombardino, 2017; Nation, 1999) and the stability of these reading disabilities profiles over grades (Catts, Hogan, & Fey, 2003).

The student's inability to decode words, *Dyslexia*, is attributed to difficulties with attacking words at the phonological level. It is essential to emphasize the relation between dyslexia and the phonological processing problem since many reading teachers tend to attribute aspects of dyslexia such as reversal, omission, and substitution of letters or words to visual processing problems (e.g., Ness & Southall, 2010; Washburn, Joshi, & Binks-Cantrell, 2011a, 2011b; Washburn, Binks-Cantrell, & Joshi, 2014). It is poor phonological processing, not visual processing, that causes students with reading disabilities to be slow and inaccurate in reading and spelling of words (Hudson et al., 2007). Students with poor decoding skills have insufficient knowledge of letter-sound relationships, poor phonemic awareness, poor phonological memory, and/or slow rapid-naming rate, impacting their ability to blend and segment words' phonemes or syllables (Gray, 2008). At the same time, those students show sufficient listening comprehension abilities evidence by successful comprehension of spoken texts (Lauterbach et al., 2017).

When the students with dyslexia fail the reading comprehension task, regardless of having proficient listening comprehension, it is because they cannot decode words with enough accuracy and speed, which hinders the meaning-construction phase (Nation, 2005). Perhaps, when the reader is faced with difficulties in decoding, most of the cognitive resources are directed to words reading, which vaccinates a vast space of the working memory lowering chances to attend for comprehension.

One the other hand, *hyperlexia* refers to a condition where the reader fails reading comprehension, despite mastery of word decoding (Grigorenko, Klin, & Volkmar, 2003), also described sometimes as reading without meaning (Aram, 1997). For its unique nature and low frequency, hyperlexia is usually perceived to be only relevant to individuals with autism spectrum disorders (Grigorenko et al., 2003). However, it has been documented with typical kids, across reading profiles (Burd, Kerbeshian, & Fisher, 1985; Catts et al., 2003) and across languages (Lee & Hwang, 2015; Nation, 1999). Difficulties in reading comprehension, in the case of students with hyperlexia, is attributed to language processing failure characterized by poor understanding at the word level, sentence level, or paragraph level (e.g., Goldberg & Rothermel, 1984; Healy, Aram, Horwitz, & Kessler, 1982; Nation, 1999; Siegel, 1984). Nation (1999) attributed this failure to difficulties related to linguistic knowledge (e.g., orthography, phonology, and semantic) and memory processing. Other researchers narrowed it down to a deficit in the semantic memory (e.g., Cardoso-Martins & Ribeiro Da Silva, 2010; Lee & Hwang, 2015). Lee and Hwang (2015) reported strong evidence attributing poor comprehension to a deficit in semantic memory. Lee and Hwang used two reading tasks to compare a

group of typical readers with another group identified as students with hyperlexia. In the first task, the students were required to read two lists, one composed of real words, and one composed of real-word like-nonsense words. In a second task, students were also provided two lists of real words, where one list has words that were attached to related priming pictures, and the other list had words that were attached to unrelated priming pictures. For both tasks, students' reading speed was recorded. Findings indicated that while students without hyperlexia showed a slower rate when reading nonsense words than that of real words, the students with hyperlexia showed similar rates of reading words from the two lists. The same observation was reported in task two when reading real words and nonsense words attached to relevant and irrelevant priming pictures. The findings indicated that students with hyperlexia could not adequately map relations between phonologic-orthographic units and their related semantic information.

In conclusion, reading is a language-based activity. For readers to accomplish the reading task, sufficient levels of the language ability should be present. Poor language abilities or insufficient language processing are the main factors contributing to failing the reading task. It is evident from the previously mentioned literature how reading disabilities are characterized by a processing failure that is language-related. Understanding these facts in ways reflected in teacher preparation and instructional practices is essential for effective and impacting teaching.

Teacher Role in Reading Acquisition

Early elementary grades are important for learning to read (Adams, 1994). Students struggling with reading at this critical stage usually end up identified with

reading disabilities (Blachman, 2000). There is no doubt that high-quality instruction at early grades can prevent reading failure (Snow et al., 1998). It is always suggested that all students should receive direct and explicit reading instruction that focuses on developing awareness of basic language elements. The report issued by the NRP (2000) highlights the necessity for explicitly reading instruction that targets teaching phonemic awareness, phonics, fluency, vocabulary, and comprehension. Also, when Vaughn, Gersten, and Chard (2000) conducted a research synthesis for the effective reading instruction for students with reading disabilities, they also emphasized the importance of explicit and systematic teaching of reading, in addition to strategy instruction, interactive grouping, and more opportunities for learning and meaningful feedback.

However, ensuring that students are taught using explicit and effective reading practices is one part of the equation that leads to meaningful reading instruction. Providing students with knowledgeable reading teachers is essential for any attempt to ensure the quality of instructional practices. Teachers' lack of necessary reading knowledge can have a severe impact on students learning during and beyond their school years (Reid Lyon & Weiser, 2009). Certainly, the huge impact teachers have over their students' learning, through helping them to acquire essential reading ability (Moats, 1999), and promoting their amount and quality of reading (Applegate & Applegate, 2004).

Therefore, some aspects of reading teachers were examined for their impact on students reading performance, such as their reading habits, knowledge of children literature, and knowledge of basic language elements. Consideration of these aspects

about reading teachers is critical for ensuring that students are receiving resourceful and meaningful support through their learning process. Through knowledge of language, teachers would be able to identify and address students' reading needs at early stages. Knowledge of children's literature allows for appropriate book suggestions and sharing of personal reading experiences, allowing teachers to provide students with a rich reading environment (Burgess, Sargent, & Smith, 2011). For ensuring the quality of their book suggestions and personal readings, however, teachers must be themselves committed readers and become open to different authors and genres (Akins, Tichenor, Heins, & Piechura, 2018; Cremin, Mottram, Bearne, & Goodwin, 2008). Following a brief discussion of the research findings related to how each of these aspects impacts the quality of teachers' reading instruction.

Teacher Reading Habits

Teachers' reading habits were the subject for some research, which suggested that teachers' amount and quality of reading impact their reading practices, and subsequently their students' reading performance. For example, Morrison, Jacobs, and Swinyard (1998) surveyed more than 1,800 elementary grade teachers examining relationships between teacher level of commitment as a reader, and their reported use of instructional reading practices. Results indicated how teachers who self-identified as committed readers showed significantly higher use of instructional reading practices. In a more recent study, although with a fewer number of participants ($n= 65$), McKool and Gespass (2009) investigated how teachers' amount of reading for pleasure influenced their use of evidence-based practices. Findings showed that only 36% of the surveyed teachers read

for pleasure, and only 11% of them read for more than 45% every day. Further correlational analysis indicated that only teachers reading for pleasure at least 30 minutes a day indicated the highest use of evidence-based reading instruction.

Burgess et al. (2011) reported findings that, while softening the impact of teachers' habits, emphasized the impact of their knowledge of children's literature. Their study surveyed the reading habits, knowledge of children literature, and instructional reading practices of 161 elementary grade teachers. Teachers stated how many books they read and how much TV they watch every day, reviewed a list of 50 children books, among which 19 authors were fake, to identify the books with real authors, and reviewed a list of evidence-based reading practices rating their frequency of using each practice. The findings indicated that only teachers with higher knowledge of children's literature were associated with a statistically significant rate of using evidence-based reading practices.

Teacher Knowledge of Children Literature

Knowledge of the text is a very important aspect to consider; if teachers are to make an impact on their students' reading performance, they should have sufficient text knowledge that allows them to provide students with a rich reading environment (McCutchen, Harry, et al., 2002). The few studies that addressed teachers' knowledge of text defined it as knowledge of children's literature. According to Akins et al. (2018), teachers' knowledge of children's literature includes the knowledge of children's books, authors, and genres. Although important, this topic is rarely addressed in the literature; the few studies that did reported worrying findings. In a study that involved early

elementary grade 59 teachers, McCutchen, Harry, et al. (2002) used a checklist for assessing teachers' knowledge of titles appropriate for first-, third-, and sixth-grade students. The study involved general and special education teachers alike. Findings indicated high knowledge of first and third grade-related titles and modest knowledge of sixth-grade-appropriate titles. However, in a study that involved more than 700 early-elementary grade teachers, Cunningham et al. (2004) found out that early elementary grade teachers showed poor knowledge of children literature, as only 10% were accurate on identifying 50% or more of the presented book titles.

Similarly, Akins et al. (2018) investigated teachers' knowledge of children literature using a survey that included 75 grade-related book titles, addressing knowledge of authors, genres, and the corresponding grade levels. The list of the inquired books was generated through inputs from education professors and school-teachers. Noteworthy, the participants ($n = 56$) varied on their teaching experiences and subject matters, including novice and experienced teachers, as well as math, science, social studies, and reading teachers. Findings suggest that teachers have high knowledge of books related to fantasy and realistic fiction, and poor knowledge of multicultural and historical texts.

Teacher Language Knowledge

Teachers' knowledge of basic language elements is essential for the quality of their reading instruction. If teachers are to provide effective explicit code-based reading instruction, they must have a basic understanding of the language and how it plays a role in the learning of reading. Studies that investigated the relationship between teachers' levels of language knowledge and their impact on their students' reading performance

reached similar findings, suggesting that it has a huge impact (Piasta et al., 2009), especially at early grades (Lane et al., 2008; McCutchen, Harry, et al., 2002). For example, in a study that included 42 first-grade teachers and their students ($n = 480$), Piasta et al. (2009) noted how students receiving code-based instruction from teachers with high language knowledge achieved significantly higher reading gains than students receiving the same reading instruction taught by incompetent teachers. In an earlier study, McCutchen, Harry, et al. (2002) conducted a study that looked at teachers' knowledge of basic language elements measuring its impact on the reading development of students at kindergarten, first-, and second-grade classrooms. Findings revealed that teacher knowledge had an impact on students reading performance across the examined grades while making the most significant impact at the kindergarten level.

Similarly, Lane et al. (2008) compared teachers' knowledge of fluency and how it impacts students' reading fluency at kindergarten, first, second, and third grades, revealing that third-grade teachers were the most knowledgeable about reading fluency, followed by second-, first-, and then kindergarten-grade teachers. At the same time, teacher knowledge of fluency had its strongest influence on only first and second grades. Although the third-grade teachers were the most knowledgeable about fluency, they had the lowest impact on the development of reading fluency for the third-graders.

To conclude, when taken together, findings reported from the previously mentioned literature indicate the immense influence teachers have over students' learning to read. Early grades teachers' knowledge of language, children's literature, and personal commitment to reading are indicators to the quality of reading instruction. The negative

impact of poor reading instruction during early grades is severe and cannot be compensated for, even as students progress to upper-grade levels (Sanders & Rivers, 1996). Therefore, teacher preparation and training programs should be oriented to ensure that pre- and in-service teachers are competent in these domains.

The Importance of Teacher Language Knowledge

The New Testament tells a story about St. Peter when he was approached by a beggar asking for money; St. Peter responded, saying that he could not give what he does not have (Acts 3:7). This biblical concept was coined the *Peter Effect* and became a mantra for the notion that we cannot teach what we do not preach or understand (Applegate & Applegate, 2004; Applegate et al., 2014; Moats & Lyon, 1996).

In Applegate and Applegate (2004), this principle was applied to the preservice teachers, examining their levels of reading commitment and engagement to reveal how that majority were not enthusiastic readers. From the literature on teachers' reading habits (e.g., McKool & Gespass, 2009; Morrison et al., 1998), it was evident that teachers' personal commitment as readers influences the quality of their reading instruction. However, it takes more than a personal reading commitment to become effective reading teachers (Cunningham et al., 2009). Therefore, several studies take the Peter Effect to a further level, investigating how teachers' knowledge shape elementary grade students' reading development. Findings from these studies reached similar conclusions suggesting that if teachers to enhance students language knowledge, and consequently their reading performance, they must have sufficient basic language knowledge themselves (e.g., Lane et al., 2008; McCutchen, Abbott, et al., 2002; Piasta et al., 2009; Podhajski et al., 2009).

The importance of knowledge of basic language structures (i.e., phonology, morphology, semantics, and syntax) for the reading teachers is twofold. First of all, the effectiveness of explicit code-based instruction for enhancing the ability to read is widely and repeatedly stated (e.g., International Dyslexia Association, 2010; NRP, 2000; Snow et al., 1998). For example, research shows that students with proficient phonemic awareness can easily and accurately decode new, unfamiliar words, and thus read more fluently, than those with developing phonemic awareness (Shankweiler & Fowler, 2004). In return, phonemic awareness depends on knowledge of letter-sound relationships, syllabic types, and the ability to blend and segment onsets and rimes on words (Adams, 1994; Wren, 2000). Teachers lacking this knowledge might struggle with addressing their students' reading needs, leading to the designing and delivering of poor and ineffective reading instruction. Second of all, knowledge of basic language elements is essential for understanding the reading profiles of students with reading disabilities. Reading disabilities prevent the processing of print either at the decoding level, the comprehension level, or both. Reading disabilities result from insufficient language processing, primarily at the phonological level (Moats & Lyon, 1996). Deficits on semantic and syntactic processing, as well as poor morphological knowledge, are also contributing factors. Understanding the language base of reading disabilities and its various types is deemed necessary since teachers are the first to notice students' reading difficulties. Knowledge of language components and processing should help the reading teachers interpret students' reading problems accurately and promptly (Moats, 2014).

On the one hand, students in general, and students with reading disabilities, in particular, need to receive explicit and systematic reading instruction that addresses language form and content. On the other hand, reading teachers must prove themselves competent in understanding and using basic language elements such as phonemic awareness and morphemic awareness. A review of the literature on teachers' knowledge of language revealed a common theme, which suggests that teachers have poor and insufficient language knowledge. However, before reporting this literature, it might be appropriate to delineate methods that are usually used for assessing this type of teachers' knowledge. Reviewing the ways researchers utilized when examining teacher language knowledge would provide a necessary context for understanding the reported findings.

Methods for Examining Teacher Language Knowledge

The review of the research on teacher language knowledge showed how using surveys is the norm and that the majority adapted the survey used in Moats (1994). Even for studies that addressed languages other than English, researchers continued structuring their survey following the model presented in Moats, among others. The survey study presented in Moats (1994) had 15 questions and was designed around determining the number of syllables and number of morphemes; identifying the third speech sound for various words; and identifying schwa vowels, consonant blends, and consonant digraphs, as well as performing other items related to spelling rules, syllable types, suffix, prefix, and word roots. This structure was followed in the majority of researchers who addressed the topic of teachers' language knowledge, and many even came to adopt the exact survey in their studies (e.g., Fielding-Barnsley & Purdie, 2005; Mahar & Richdale, 2008;

Mather, Bos, & Babur, 2001; McCutchen, Abbott, et al., 2002; McCutchen, Harry, et al., 2002; Podhajski et al., 2009; Washburn et al., 2011a, 2011b).

Podhajski et al. (2009) addressed teachers' knowledge of language structure using a survey of 32-multiple choice items adapted from Lerner (1993), Moats (1994), and Rath (1995). Types of questions included defining terminologies, identify words consonant digraph, counting speech sounds, and counting the number of morphemes. Although Podhajski et al. (2009) preserved the nature of the adapted tasks that participants are expected to perform, they made slight changes in the way the teachers respond to make the calculation process more precise. For example, while in Moats (1994) the participants were expected to manually fill out the form writing down their responses with no options to guess from, in Podhajski et al. (2009) participants were to choose from a list of options the correct response (i.e., multiple-choice format). Similarly, Fielding-Barnsley and Purdie (2005) used a questionnaire to address teachers' philosophical orientation and the knowledge of the structure of the English language at the word and sound level. For that, the questionnaire was composed of two sections; a section that was adapted from Bos, Mather, Narr, and Babur (1999) with items on meaning-based and code-based instruction; and a section with 10 multiple-choice items and adapted from Moats (1994). Like Podhajski et al. (2009), the researchers kept the task type, but they changed the content and layout of the questions. Examples of the language knowledge-related items include defining terminology, identifying words with short vowels, words with diphthongs, and schwa, counting the number of sounds in words, and

counting the number of syllables. Mahar and Richdale (2008) later came to use the same survey in their study.

Researchers who examine teachers' knowledge of languages other than English also used a survey structure and the questioning format similar to that used in Moats (1994) and other similar studies. For example, Aro and Björn (2016) conducted a study that examines teachers' knowledge of the Finnish language. For that purpose, they created a questionnaire based on a similar questionnaire that appeared in Binks-Cantrell, Joshi, and Washburn (2012), a survey with 46 items that were designed to address self-perception, knowledge, and skills of phonemic awareness, phonics, and morphology. Noteworthy, the original questionnaire in Binks-Cantrell et al. (2012) was itself an adaptation from similar survey studies (Bos et al., 1999; Moats, 1994), and appeared in previous studies (i.e., Joshi, Binks-Cantrell, Dean, & Graham, 2006; Joshi et al., 2009). Although Aro and Björn kept the structure, the researchers changed the content of the questionnaire to reflect the Finnish language. Examples of the tasks that participants completed were defining language terminology, counting the number of phonemes in words, counting the number of syllables, counting the number of morphemes, and identifying prefixes, roots, and suffixes in a given list of words.

Adaptation of a pre-existing survey is a norm that is noticed in many studies addressing teachers' language knowledge. Even when some researchers developed new language surveys, they kept using the same types of questions that appeared in Moats (1994). For example, Spear-Swerling and Brucker (2003) designed a survey that addressed knowledge of word structure among preservice teachers; participants were

tasked with completing 50 items around graph-phonemic segmentation (16 words), syllable types (14 words), and phonetically irregular words (20 words). Participants were introduced to examples that explained what they were to perform to prevent the impact of task-novelty. In the graph-phonemic segmentation related-items, participants were expected to read a list of words and indicate the number of phonemes in each; the list included words with one-or-two syllables, words with silent letters, and words with diphthongs. Syllable-related items include words that represent different syllabic patterns such as closed and open syllables, silent e, vowel team, and vowel r-closed. Last, a list of 40 words, among which 20 words were phonetically irregular, was presented within the survey for teachers to identify the phonetically irregular words. Although Spear-Swerling and Brucker used similar tasks to those of Moats, they made two significant contributions; the first related to task novelty; and the second related to the scoring techniques. Each task was preceded with an example that modeled how to perform the task, which is suggested to reduce prevent failing to perform the task as a result of not understanding it. Second, the scoring of the survey items was equal to 0 or 1, so the lowest the participant could score was a score of 0, and the highest score was 50; this helped to make the analysis more transparent and accurate.

In a later survey study, Spear-Swerling, Brucker, and Alfano (2005) adapted the same survey, adding a section that examined how teachers perceived their language knowledge; inquiring about teachers' perceived knowledge appeared later in many studies. In Spear-Swerling et al. (2005), participants were tasked with a 5-point rating scale to self-rate their knowledge of reading development, phonemic awareness, phonics,

and morphology. Thus, the survey has two sections—a section where teachers provide their background information and rate their perceived knowledge and a section that examines teachers' actual language and reading knowledge. Teachers' actual knowledge was assessed using five main tasks that included five items on teachers' knowledge of phonemic awareness, fluency, morphology, reading factors that leads to reading failure, and how the reading environment impacts reading; 12 items on morpheme counting task; 16 items on graph-phonemic segmentation task; 42 items on identifying syllable types; and 40 items for identifying phonetically irregular and regular words.

From this analytical review of these studies, it appears that researchers are keen on using certain activities for examining teachers' understanding and application of basic language structures. Table 2 shows the aspect of language knowledge usually addressed by researchers with what type of questions. Most of the surveys on teachers' language knowledge use tasks where teachers engage in defining terminologies, and performing phonics, phonology, and morphology.

A critical look at these surveys indicate similarities and differences in the manner of presentation, the number of items devoted to each language construct, and the type of questions used. All the reviewed questionnaires were similar in including a section on participants' background knowledge collecting information on their years of experience, type of certification, gender, grade, number of language-related courses taken at the joined teacher preparation program, and number of language-related professional development workshops. This information is considered when analyzing the data to determine the correlation between variables. Studies that investigated the role of

perceived language knowledge on participants' actual levels of language knowledge included an item where teachers were required to self-rate their knowledge of some language domain (e.g., phonemic knowledge, morphology, and reading processes). Other studies also examined how the role of instructional orientation, or teachers' preferred way of teaching reading (i.e., code-based instruction vs. meaning-based instruction), impact their knowledge of basic language elements.

Table 2

Language Domains and How They Are Addressed in Study Surveys

Domain	Topic of the Question	Example
General Knowledge	Defining language-related terminologies	Phonemic awareness is (R. Cohen, Mather, Schneider, & White, 2017), (i.e., the ability to derive meaning from a word; the ability to recognize and manipulate the individual sounds in spoken language; the ability to use sound-symbol (phoneme-grapheme) correspondences to read and spell new words; or both b and c)
Perceived Knowledge	Rating ones' perception of knowledge related to different topics	Rate your perceived knowledge related to (Aro & Björn, 2016), (i.e., phonemic awareness; initial instruction of reading fluency; vocabulary; reading comprehension spelling; dyslexia; or children's literature.)
Phonology	Identifying the number of sounds in a given list of words.	How many speech sounds in the following words: king, thank, straight? (Moats, 1994) How many speech sounds in the word eight? (options: 2, 3, 4, 5) (Podhajski et al., 2009).
	Identifying the number of phonemes	Identify the number of phonemes in each of the following words: e.g., sea, mild, debt, flight, show, and vandal (Spear-Swerling & Brucker, 2003).
	Identify syllable type in a given list of words.	For this list of nonsense word, identify the type of syllable: e.g., ack, nalk, sply, fisp (Spear-Swerling & Brucker, 2003)
	Counting the number of syllables in words.	How many syllables in the word "radio"? (1, 2, 3, 4, do not know) (Aro & Björn, 2016)
Morphology	Counting the number of morphemes in words.	How many morphemes in the word unhappiness? (options: 2, 3, 4, 1, do not know) (Podhajski et al., 2009)

Regarding language knowledge, each survey has a separate section devoted to examining this knowledge at the abstract and the application level. Each survey has a set of items for teachers to define language-related terminologies (e.g., what is phonemic awareness?), or respond to a proposed statement (e.g., the English language has all the following syllable types except one, what is it?). Another set of items (usually multiple-choice) is often used to examine teachers' level of application of phonology and morphology, although surveys differed in terms of the number of items they devote to each of these aspects (e.g., general language knowledge, language ability, phonology, morphology). For example, the survey by Moats (1994) included 15 items, where eight items addressed the general language knowledge, and seven items addressed the ability to perform language tasks; the survey addressed phonology and morphology at the abstract and application level. Spear-Swerling et al. (2005) used a survey that had only five items on the general language knowledge, and 90 items on examining the ability to apply it. From these 90 items, only 12 items were related to morphology, and the remaining 78 items were phonology tasks.

Similarly, Aro and Björn (2016), who addressed the knowledge of Finnish language, used a 41-item survey. The survey had 10 items that examined teachers' knowledge about the language, and 31 items that evaluated teachers' ability to perform morphology-related and phonology-related tasks; in this regard, the survey had 13 items on morphology and 18 items on phonology. Binks-Cantrell et al. (2012) created a survey with eight items on perceived language knowledge and 38 items on the knowledge and ability to perform language tasks; eight items addressed morphology while 30 items

addressed phonology. However, Mather et al. (2001) disregarded morphology in their survey, which had 25 items on determining instructional orientation (i.e., code-based vs. meaning-based), 10 items on the general language knowledge, and 12 items on the application of phonology knowledge. Also, Fielding-Barnsley and Purdie (2005) included only items on phonology. The survey had 25 items on the instructional orientation and 22 items on the phonology knowledge; from the phonology items, 10 items addressed the general knowledge, and 12 items addressed the phonological ability. It is noteworthy to say that in each of the reviewed surveys, the majority of items were phonology-related, and the morphology items made up less than 31% of any survey; also, unlike morphology, phonology is present in all the surveys that addressed teachers' language knowledge.

Teacher Language Knowledge: Research Findings

Empowered by the belief that teachers must possess knowledge of language to teach students how to read effectively, general and special education teachers alike were targeted in a series of survey studies. The study by Moats (1994) is a seminal work in this regard and provided an exemplary way for examining teacher language knowledge. Before this study, the impression was that teachers with proficient reading skills could teach reading, as long as they have knowledge of and use effective reading instruction. However, Moats's findings were alarming and caused an enormous reaction among reading researchers, which led to a series of similar studies. In that study, Moats administered a group of 89 general and special education teachers with an average of 5 years of teaching experience. The survey in Moats accounted for teachers' knowledge of

language-related terminologies and levels of application. Therefore, it included graphophonemic knowledge, syllable types, morphemic knowledge, and syntactic knowledge. The results showed that teachers have low knowledge of basic language concepts, as more than 50% struggled with vowels (identifying the schwa), more than 70% struggled with spelling (explaining the use of - ck), more than 70% had difficulty identifying the component morphemes of transparent words, and almost all teachers could not identify a consonant digraph. In a later study, Moats and Lyon (1996) applied the same survey to a sample of 103 uncertified literacy teachers. Results were consistent with the findings from the first study, as teachers scored poorly across all the tested domains. Only 10-20% of the teachers were successful in performing phonics-related items, and only 27% responded successfully to items related to morpheme structure. Teachers struggled with basic tasks such as identifying consonant blends, consonant digraphs, analyzing words into their morpheme components, and spelling words with silent letters.

In Mather et al. (2001), a group of 293 pre- and in-service teachers were administered a version of Moats's (1994) language knowledge survey. Findings indicated poor performance across the two groups of teachers, as the majority struggled with performing tasks such as identifying schwa, diphthong, and voiced consonants in words, as well as with defining essential linguistic concepts such as phonemic awareness, digraph, or syllables. An example of their poor performance includes failing an item that required identifying the number of speech sounds in words such as box (10.5%) or grass (42.5%). Similar findings were also reported in a study that included more than 700

general classroom teachers (Cunningham et al., 2004). The researchers used a different language knowledge survey than that of Moats, which included two main parts: a task where participants count the number of phonemes in words for a list of 11 words, and seven multiple-choice items that addressed counting syllables, identifying schwa in words, and identifying syllable types. The findings were no different from previous studies. In the first task, only 1% of the participating teachers were able to identify the number of phonemes in all the listed words correctly, 30% were successful in half of the words, and 20% were unable to count phonemes in any given word. In the second task, less than 1% were correct on all the seven multiple-choice items, and 28% were correct on half of these items. Teachers scored the highest on the item where they had to identify a word with a closed syllable while scoring the lowest where they had to define the concept of consonant speech sound.

In addition to the fact that teachers lack the essential language knowledge, teachers seemed to have better phonology knowledge than morphology knowledge. Piasta et al. (2009) targeted 42 first-grade teachers from 10 different schools in Florida. Findings indicated that teachers have poor language knowledge evident by an overall average rate of 52%, scoring the highest in phonics-related items and the lowest in the morphology items. Also, Washburn et al. (2011a) reported similar results when they examined 185 teachers for their phonological awareness, phonemic awareness, and morphological awareness. Teachers scored higher on items related to phonological awareness (86%) and phonemic awareness (68%) while scoring significantly lower on morphology items (53%). The overall average performance was 65%, indicating low

language knowledge; the majority of teachers failed to correctly identify the correct definitions of phonological awareness and phonemic awareness. In a more recent study from New Zealand, Chapman et al. (2018) investigated different aspects of teachers' literacy knowledge and practices among pre-service teachers. They utilized the language knowledge survey from Binks-Cantrell et al. (2012). Findings showed that the overall rate of correct responses made by teachers on the survey was 66.5%, with the phonological awareness receiving the highest correct response rate (89%) and the morphological knowledge receiving the lowest rate (53%).

Several other studies were conducted regarding teacher language knowledge, mostly utilizing the survey instrument in Moats's (1994) study. The repeated finding across all these studies was that elementary grade teachers, regardless of the certification type, teaching experiences, perceived knowledge, and across English and non-English speaking countries, all lack sufficient language knowledge, which is deemed necessary to teach explicit code-based reading instruction. A close review of these findings suggests the existence of some patterns, including that all teachers regardless of their certification type and teaching experience lack sufficient language knowledge, special education teachers seemed to have a better understanding of language structure compared to general classroom teachers, and that teachers seemed to overestimate their language knowledge, especially when they have more teaching experiences. The findings from the literature are organized in the following sections to address the impact of certification type, prior literacy preparation, prior teaching experience, and self-perception of language knowledge.

Language Knowledge and Teacher Certification Type

The impact of teachers' type of certification (i.e., special education, or general education) on their language knowledge was barely considered. Most of the studies that include special and general education teachers (e.g., Alatalo, 2016; Mahar & Richdale, 2008; McCombes-Tolis & Feinn, 2008; Moats, 1994; Spear-Swerling et al., 2005) did not report findings examining differences between teachers based on their certification type. However, the few studies that included such consideration reported findings which suggest that differences in the type of certification have a significant impact on teacher language knowledge.

McCutchen, Abbott, et al. (2002) surveyed 59 general and special education teachers across kindergarten through grade 3 on performing Moats's language knowledge survey and continued to report poor language knowledge. Teachers' accuracy on answering the survey items ranged between 30-35%. The relationship between teachers' characteristics and language knowledge revealed that philosophical orientation and teaching experience did not influence their exhibited levels of language knowledge. However, certification type made a significant contribution to teachers' knowledge, as special education teachers scored significantly higher than general classroom teachers. Similarly, when Fielding-Barnsley and Purdie (2005) included 340 special and general classroom teachers from Australia, the special education teachers scored significantly higher than the general education teachers.

Nonetheless, all teachers found to have poor language knowledge across most test items. Teachers achieved an average accuracy rate of 24% on identifying the number of

speech sounds in a given word, 20% on identifying voiced consonant digraphs, and 22% on identifying diphthongs. The only two items where all teachers achieved high accuracy rates were that of identifying words with short vowel sounds (92%) and counting the number of syllables in a given word (89%).

The general finding from these two studies is that special education teachers have better language knowledge than general education teachers. However, there is a scarcity of studies in this regard; thus, further examination of this aspect of teachers is needed, as it might lead to further studies into components within special education teachers that leads them to have better language knowledge, components such as the teacher preparation programs, in-service training, working conditions, or any interpersonal factors.

Language Knowledge and Teacher Level of Literacy Preparation

Literacy preparation was defined in the literature as the number of courses completed by teachers in relation to their knowledge of basic language elements or reading and writing instruction. The confounding belief behind this line of research is that more literacy courses during teacher preparation programs would lead to better language knowledge. This hypothesis was tested using correlational and experimental research, yielding somehow mixed results that still need further exploration.

In Mather et al. (2001), the study included pre- and in-service teachers alike. The findings indicated that teachers have poor language knowledge, and the difference in numbers of completed literacy courses did not influence teacher knowledge. Similarly, Clark, Helfrich, and Hatch (2017) included a group of 87 pre-service teachers from two

different teacher preparation programs. These two teacher preparation programs (TPP) offered different numbers of literacy courses. While the one TPP offered student-teachers with five reading method courses, the other TPP offered student-teachers with only two reading method courses. The first TPP offered specific courses related to children's literature, emergent readers, methods of teaching reading, phonics instruction, language structure, and observing of young readers; the second TPP offered only a course on literacy instruction and a course on reading assessment. All the participants ($n = 87$) from the two TPPs had already completed taken the required reading method courses before participating in the study. Data collection tools included the reading subtest of the Literacy Information Knowledge Scale–Written Survey (Reutzel et al., 2007), which assesses for student teachers' content knowledge and pedagogical knowledge. Findings indicated that preservice teachers on average responded correctly to 70% of phonics items, 62% of phonology-related items, 44% of fluency items, 63% of comprehension items, and 53% of vocabulary items (the overall is 68%). Surprisingly, when the two groups were compared based on their knowledge, student-teachers with fewer reading method courses significantly outperformed student-teachers with a higher number of reading courses at all the tested domains. This finding confirmed the conclusion made in Mather et al. (2001) that the number of completed literacy courses does not influence teacher language knowledge.

However, Spear-Swerling and Brucker (2003) reported contradictory results. Spear-Swerling and Brucker tasked 90 teachers enrolled in a special education certification program with a language knowledge survey that assessed for knowledge of

phonology and morphology. This study used a pre- and post-test design to examine how teachers' language knowledge is influenced by special training, taking into account teachers' teaching experience and prior preparation. The findings indicated that only prior preparation was found to have a statistically significant influence over teachers' performance during the pre- and post-language test. Also, Alatalo (2016) reported supportive results that suggest the essential role for prior literacy preparation in predicting teachers' language knowledge. The study involved 269 general education teachers from Sweden. The teacher knowledge survey included language-related items adopted from several survey studies, including Moats (1994). Findings showed that although all teachers showed poor and insufficient language knowledge, teachers with more literacy preparation scored significantly higher than teachers with little or no literacy preparation.

From the reported studies, it can be suggested that findings on the role of prior literacy preparation on teachers' language knowledge are still emerging. However, a note should be made about the findings of these studies. These studies focused on the number of the completed literacy courses, as the indicator for better or poor literacy preparation. However, the quality of these courses was not questioned. The quality of preparation might be the factor that deserves investigation rather than the affordance of the preparation.

Language Knowledge and Teacher Experience

The majority of the studies that investigated the role of teacher teaching experience in their language knowledge tended to compare pre-service teachers to in-

service teachers. It seems that since in-service teachers are more experienced in the teaching of reading within real authentic teaching situations than the pre-service, the assumption is for the in-service teacher to have more language knowledge. Some studies used their findings to advocate for providing pre-service teachers with more authentic teaching experiences. The findings of the majority of the studies that investigated this possibility are that in-service teachers have better language knowledge than pre-service teachers.

In Mather et al. (2001), the pre- and in-service teachers ($n = 293$) were administered the survey by Moats (1994). The findings indicated that the in-service teachers scored significantly higher than the pre-service teachers across all the domains of the survey. Similarly, Fielding-Barnsley and Purdie (2005), when involving 340 special and general education Australian teachers, reported that the in-service teachers showed significantly better language knowledge compared to the pre-service teachers. Also from Australia, Mahar and Richdale (2008) targeted 120 pre- and in-service teachers from Australia using a questionnaire developed to contain multiple-choice items borrowed from survey studies of Moats (1994) and Mather et al. (2001). The findings showed that both pre- and in-service teachers have poor language knowledge, and the in-service teachers scored significantly higher than pre-service teachers. Similar findings were also reported in Washburn et al. (2011a). In this study, 185 teachers were involved; 48% were pre-service teachers, and 52% were in-service teachers. Findings indicated that the in-service teachers outperformed their novice teacher counterparts across most of the survey items. Additionally, Aro and Björn (2016) compared pre-service to in-service

Finnish teachers on their language knowledge, reporting similar results. Although the overall performance indicated low language knowledge (57%), the in-service teachers scored significantly higher than the pre-service teachers. It is noteworthy to say that the pre-service teachers were all from the general education pathway, while the in-service teachers were all from the special education pathway.

Using teacher status (pre-service or in-service) is a very simple and straightforward way to define the parameters of what can be called “teaching experience.” However, some researchers chose to define the “teaching experience” as the number of teaching years completed by the teacher (Jordan, Bratsch-Hines, & Vernon-Feagans, 2018; Piasta et al., 2009). Although the findings of these studies are consistent with those reported in previous studies regarding the importance of having authentic teaching opportunities for teachers to have better language knowledge, their findings highlight the need for further questioning of the quality of the teaching experience. For example, Jordan et al. (2018) involved 66 reading teachers at kindergarten and first grades in responding to a survey that addressed teacher content knowledge, defined as knowledge of phonemic awareness, morphology, syntax, semantics, and text structure. The survey was developed using items in Moats (1994) and Piasta et al. (2009). The regression modeling indicated that, when controlled for race, age, and grade level, years of teaching was significantly associated with teachers’ content knowledge. On the other hand, Piasta et al. (2009) reported findings that limited the suggested impact of the teaching experience on teacher language knowledge to only that of teaching first-graders. Teachers’ general teaching experience was found to have no impact on their language

knowledge; instead, their specific experience with teaching first grade was found to be significantly associated.

The findings from the previously mentioned literature emphasize the importance of teaching experience on teacher language knowledge; in-service teachers, teachers with more teaching experience, and specific teaching experience in first grade seemed to have a positive impact on teacher language knowledge. Noteworthy, assuming that allowing teachers more time in teaching would improve their language knowledge might be misleading. This line of research into the role of teaching experience in teachers' language knowledge is still emerging. Future studies are expected to focus on the amount of teaching (i.e., number of years) and the quality of the teaching experience as possible factors shaping teacher's language knowledge. The current body of research does not yet allow for accepting this suggestive role of teaching experience.

Teacher Level of Perceived Language Knowledge

Teachers need to be aware of their language knowledge. Awareness of one's knowledge is necessary for seeking ways to improve. When teachers approach teaching reading with high and unfounded confidence in their reading content knowledge, they might be less willing to search for professional development opportunities.

The literature suggests the fact that teachers tend to overestimate their language knowledge. In the study by Cunningham et al. (2004), there were no significant differences in the language knowledge between teachers with high self-perceived knowledge and teachers with low self-perceived knowledge. Further statistical analysis indicated that teachers who claimed to have higher language knowledge scored

significantly less than teachers identified with having low knowledge on more than one-third of the survey items. Similarly, Spear-Swerling et al. (2005) conducted a study on 132 teachers attending graduate studies, for their self-perception and actual levels of language knowledge. The findings also strengthened the general observation that teachers overestimated their language level while performing poorly on the presented language survey. More recently, Chapman et al. (2018) investigated language knowledge among pre-service teachers from New Zealand. The findings showed that the participants lacked sufficient language knowledge ($M = 66.5\%$), while the majority self-rated their perceived knowledge as moderate, high, or very high.

Other studies within this line of research counted for the role of teachers' background on how they perceive their language knowledge. The overall findings were no different from the previously mentioned studies regarding teachers' tendency to overestimate their language knowledge; however, these studies indicated how factors such as teaching experience or completion of literacy courses have some impact on teachers' perceptions. For example, as part of the study by Spear-Swerling et al. (2005), they examined the impact of literacy preparation (i.e., teaching experience, and enrolment in literacy courses) on teachers perceived and actual language knowledge, grouping teachers into three distinctive groups (i.e., low, average, high). Their findings indicated how participants in the low literacy preparation group rated themselves significantly lower than their peers in the other two groups, which is also how they performed in the language knowledge survey, as they performed significantly lower than the groups of average or high literacy preparation. Likewise, Washburn et al. (2011a) examined the

impact of teachers' teaching experience on their self-perception and actual levels of language knowledge. The findings indicated that novice teachers (i.e., first-year teachers) rated their language knowledge significantly lower than their counterparts who had more teaching experience (i.e., 1–38 years of teaching), which mirrored how they performed in the language survey compared to the more experienced teachers.

Additionally, the study by Aro and Björn (2016) investigated language knowledge among 220 pre- and-in service teachers from Finland. Adding that in-service teachers scored significantly higher than pre-service teachers, the study used correlational analysis to indicate that for in-service teachers, there was a moderate correlation between teaching experience and perceived knowledge of phonology and phonics, paired with a small correlation between teaching experience and perceived knowledge of morphology, whereas for pre-service teachers, the correlation was close to zero for all the three tested domains.

The findings from the reported studies showed how teachers have unrealistic views about their language knowledge, clear from their tendency to self-rate their knowledge as high, while at the same time continuing to perform poorly on language surveys. Also, some studies indicated that teacher experience has some impact on how they perceive their language knowledge, as evidenced by the significant differences in perception between the teachers. In-service teachers and teachers with more teaching experience, compared to pre-service teachers and teachers with less teaching experience, self-rated their perception of language knowledge significantly higher than their counterparts. It suggests that the further the teachers go through the teaching experience,

the further they build unrealistic confidence in their language knowledge. However, it should be noted that regardless of these significant differences between teachers, teachers in general overestimate their language knowledge.

Summary of the Literature Review and Directions for Future Research

The literature on the language knowledge of the reading teachers is still developing. The research consensus is still building regarding some of the main findings reported in this literature. Aside from the fact that teachers have poor knowledge of basic linguistic elements that create the backbone of any successful explicit teaching of the reading decoding, the findings regarding the role of teachers' type of certification, prior literacy preparation, teaching experience, and self-perception still need further investigation. From the reported literature, only two studies examined the impact of certification type on teacher language knowledge, favoring special education teachers. Also, the findings on prior literacy preparation are still emerging, with studies reporting inconsistent findings on the impact of completing more literacy courses.

On the other hand, most of the studies that examined the impact of teaching experience compared pre- and in-service teachers, reporting findings that favor in-service teachers. Few studies defined the teaching experience in terms of the number of years teaching; while the findings from one study indicated that more years of teaching led to significantly better language knowledge, the other study suggested that it is only years of teaching first grade that produced the significant impact on teacher language knowledge. Finally, the studies that investigated teachers' self-perception indicated that teachers in

general tend to overestimate their language knowledge and that more teaching experiences led to significantly higher self-perception of language knowledge.

This review suggests that future research should address the following aspects. First, the literature suggests that teachers, regardless of their certification type, teaching experience, and prior preparation, have poor language knowledge, accompanied by unrealistic self-perception of knowledge. However, since most of the literature within this area of research comes from English-speaking countries, future studies should seek replication of these findings across different countries and across different languages. Second, only two studies addressed the impact of certification type on teacher language knowledge with results suggesting that it makes significant differences. Thus, while more research is needed that examines the speculative role of certification type, it should also explore the components within the special education context and/or general education context that led to such differences in performance. Third, the findings on the role of prior literacy preparation are based only on the reported number of completed literacy courses. Using the number of courses completed to judge the role of literacy preparation might be misleading. There should be a more comprehensive and reflective way that takes into account not only the number of courses but also the quality of the preparation. It might be suggested that future studies into the role of prior literacy preparation approach this aspect with more focus into other aspects of the literacy experience, such as course content, the inclusion of authentic teaching experiences, quality of the instructors, etc. Undoubtedly, conducting such an investigation that goes beyond the mere number of courses into the quality of the course is difficult and complicated; however, it should

allow for an effective examination of the role of literacy preparation in teacher language knowledge. Finally, the findings on teachers' perceived language knowledge are consistent in indicating how teachers always tend to overestimate their language knowledge. However, this line of research still needs further studies that, in addition to teaching experience, also examine the role of teachers' type of certification and prior literacy preparation on their self-perception of their language knowledge.

Therefore, this current study seeks to fill some of the gaps identified in the literature of teacher language knowledge. First of all, this study addresses the Arabic language knowledge among Saudi elementary grade teachers, a population and a language yet to be addressed in this literature. Also, the study adds to the literature by examining the role of teacher certification type and the impact of teaching experience on their language knowledge, expanding on the findings reported in previous studies. However, in contrast with the majority of studies that conceptualized teaching experience using pre- and in-service teachers, this study defines the teaching experience in terms of the number of teaching years completed by teachers. Furthermore, this study expands the current literature when examining the difference in knowledge perception based on teachers' certification type. Finally, a major contribution to the literature is this study's use of follow-up interviews to interpret the possible factors shaping teacher language knowledge.

Saudi Arabia: The Country and the Education

In 1932, a very long and hard mission started back in 1915, was crowned by the establishment of the kingdom of Saudi Arabia. King Abdul-Aziz was the first ruler of the

new-born country. Saudi Arabia is in the southwest corner of Asia and occupying the bulk of the Arabian Peninsula. It has a population of 34.2 million. Saudi Arabia, as a society, is very young, with 50% of its citizens are 29 years of age or younger. According to Mobaraki and Söderfeldt, (2010), it is typical to find a Saudi family with many children who come to be close in age due to Saudi women maintaining short birth intervals. This raises significant challenges for the country to face, including providing adequate educational opportunities for its citizens. Education could be the tool that makes this huge percentage of youth a leading factor for prosperity and development if the quality of education is ensured and granted for all students.

The Educational System in Saudi Arabia

Before 1926, mosques and local communities were providing some basic schooling (Metz, 1993). It was formal only in the sense that children would be instructed by teachers appointed by the local community to teach certain times a few days a week. Study materials were based on Arabic literature and religious topics (Metz, 1993), and it was intended to give students the basic orientation needed for them to function properly in society. For those interested in pursuing further education, they would have to engage in long-term travel to neighboring cities such as Cairo and Bagdad (Metz, 1993), or even overseas to India or beyond. However, as of 1926, King Abdul-Aziz was committed to the idea of transforming the locally practiced form of education by establishing the first directorate of education. This action marked the first governmental involvement in Saudi education.

Education in Saudi Arabia is mandatory. The education system is structured and regulated mainly by the Ministry of Education in a centralized approach (Hein, Tan, Aljughaiman, & Grigorenko, 2015). The same department runs both systems of higher and primary education. Higher education is represented by a total of 25 public universities and community colleges, and 51 private universities. In primary education, there are 45 school districts spread across the country. However, the Ministry of Education controls all the educational and organizational aspects of the education system, including running and building of schools, designing and distributing curricula, evaluating students, training teachers, recruiting teachers and principals, providing professional training, etc.

With little attention given recently to pre-schooling, the general primary education consists of three main phases: elementary school level (Grades 1– 6), middle school level (Grades 7– 9), and high school level (Grades 10– 12). At the primary school level, students are taught basic literacy skills (reading, writing, science, and math) and basic religious information (e.g., basic Islamic beliefs and instructions on how to perform the daily prayers). Also, students recently are starting to receive instruction on the English language and the computer provided by certified teachers. Furthermore, in social studies, which starts at Grade 4, students receive extensive information related to the establishment of the country as well as to the life of the prophet of Islam. In middle school, students start to receive some advanced instruction in math and science, as well as extensive instruction on theology and Arabic literature. Some more advanced instructions on the English language and computers are also provided. In high school, students start

their 10th-grade year with a high volume of academic subjects that cover a wide range of scientific and literature related topics including physics, chemistry, biology, Islamic law, Arabic poetry, etc. This method is suggested to allow students to explore these different knowledge fields so that they can choose their future areas of specialization. However, in general, teaching is based on rote learning, as students are expected and taught to memorize information with minimal emphasis on skills required for competing in the global market (Hein et al., 2015). As students leave the 10th-grade year, they are to choose one of two educational paths (scientific path or literature path) for their 11th and 12th grades. It is noteworthy that, besides the typical high school systems, students have the option to join scientific institutions at which students spend 3 years on extensive Islamic and Arabic studies. Graduates from these institutions have a great opportunity to serve in the legal system of Saudi Arabia after they get an Islamic studies-related bachelor's degree.

Education in Saudi Arabia is free, starting from the first grade and up to the graduate studies. In fact, in some cases, especially in rural areas, students might be given some financial compensation as a way of helping them cover the everyday traveling expenses to and from school. At the higher education level, full-time students in all universities are given a monthly salary that is estimated to be equal to \$250. This is suggested to help with covering students' educational expenses (e.g., buying books, food, and for rent) and increase retention rates.

Education in Saudi Arabia is segregated by gender as well as by type of disability. Gender segregation in education is based on the norms and culture of society, as well as

the local interpretation of Islamic scriptures. Accordingly, males and females are taught in separate buildings and by same-gender teachers. However, all students, regardless of their gender, are ensured and entitled to receive the same educational quality. Until recently, male education and female education were run by two separate governmental entities. However, this was ended due to organizational and financial issues. In terms of segregation based on the type of disability, this practice is based on organizational and educational considerations. The deriving beliefs behind this practice ensure the quality of the provided services and facilitating the process of preparing special education teachers. Therefore, pre-service teachers are trained to provide special education services utilizing a categorical approach, so teaching certifications are given based on the type of disability with which the teacher is prepared and allowed to work.

Special Education in Saudi Arabia

Before 1958, the responsibility of providing special education services to students with special needs was carried by their families with no support from the government. However, in 1957 a group of blind individuals learned the Braille language, which started a personal effort of establishing night classes for teaching this language to others so they could read by themselves (Al-Mosa, 1999). This initiative led the Ministry of Education to take the action of establishing the first Special Education Office in 1960, which is now the General Secretariat of Special Education (GSSE). The main goal of that office was to organize the process of providing education to students with blindness. Modeled after the United States and other western countries at that time, the office started with building special education institutions designed to serve students in isolation from their peers,

believing that it would help to provide them an individualized and high-quality education. Subsequently, students with other types of special needs were given access to these night classes, which led to another initiative of constructing special education institutions. By 1974, there were Al-Noor (light) institutions (for blind students), Al-Amal (Hope) Institutions (for deaf students), and the Institution for Intellectual Education (for students with intellectual disabilities). As for students with learning disabilities (LDs), they had to wait until 1995 to start receiving special education services.

In terms of teacher preparation programs, King Saud University was the first to establish its Department of Special Education in 1984. Needless to say, because of the lack of specialized personnel, students in these institutions were served by outside experts and by general education teachers who had the interest to do so. Thus, the government gives a 20-30% increase in the basic salary as a way of improving the numbers of special education teachers. Currently, according to statistics from the Ministry of Education, there are more than 53,000 students identified with special needs and served by 28,005 certified special education teachers in public and private schools, which gives a student-teacher ratio of 2:1.

Major special education laws and legislations. The Saudi Protection of Handicapped Act (SPHA) was issued in 2000. The SPHA is a 13-page law that guarantees and regulates basic health, work, rehabilitation, social, cultural, educational, and physical rights. Under the educational rights, individuals with disabilities are granted meaningful and appropriate public education. Another important piece of legislation is the Regulations of Special Education Institutions and Programs (RSEIP). The first

publication of this document came from the General Secretariat of Special Education (GSSE) in the 2001 academic year (Ministry of Education, 2002). The RSEIP has 11 chapters that regulate all aspects related to education for students with disabilities. Chapter 1 defines concepts related to special education, as represented in the document. Chapters 2 and 3 describe the goals and objectives of the provided special education services. Chapter 4 describes the definitions and the eligibility procedures for the ten disability categories covered by these legislations (i.e., deafness, blindness, intellectual disability, multiple disabilities, learning disability, autism, behavioral and emotional disorders, physical and health problems, giftedness, and communication disorders. Chapter 5 covers transition and rehabilitation programs for students with disabilities. Chapters 6 and 7 define the roles and responsibilities of all individuals involved in the provision of special education services, as well as the relations between special education programs and the larger community. Chapters 8, 9, and 10 of the RSEIP cover concepts related to assessment and evaluation as well as the Individualized Educational Plan (IEP). Finally, Chapter 11 concludes with general information and considerations necessary for the effective implementation of the RSEIP.

Referral and eligibility determination practices for students with LDs. The processes of referral, eligibility determination for special education services, and placement are regulated by Chapter 4 of RSEIP. For each category, the chapter states the placement, educational curriculum, qualifications of special educators and paraeducators, and eligibility criteria. However, there is a huge implementation gap related to how these processes are legislatively outlined and how they are actually practiced.

As outlined by RSEIP, the eligibility of students with LDs to receive special education services is determined by the discrepancy analysis model, through which the intellectual performance and the academic achievement of the student are compared and documented if a discrepancy exists. Furthermore, the documented discrepancy should not be attributed to economic or social disadvantages, poor instruction, or a result of the student having another type of mental or sensory disability. This comes according to how those students have been defined in U.S. federal educational laws. The RSEIP also emphasizes the requirement that a multi-disciplinary team conducts the eligibility determination process.

Teacher preparation programs. Teacher preparation programs (TPPs) in Saudi Arabia are university-based. Among the 25 public universities, 17 provide TPPs following the categorical approach. The first special education TPP established in Saudi Arabia was that of King Saud University in 1984. The remaining 16 TPPs came after 2005. During their first 2 years of their TPP, all pre-service teachers are to complete courses that cover a broad range of educational topics including special education, Islamic education, Arabic literature, and curriculum structure. At the start of the third year of the TPP, the pre-service teachers have to specialize in one disability category, where they receive more theoretical and practical information related to assessment, identification, teaching, IEP building, of the chosen disability category.

There is a scarcity of studies that looked at the structure and the quality of the special education TPP. However, Hussain (2009) pointed out that the TPP for teachers of students with LDs are based on the presentation of theoretical information and lack any

opportunities for student teachers to acquire meaningful and authentic learning experience. Hussain further added that faculties in these programs rely only on exams for evaluating students' understanding of what they learn. This is inappropriate for gauging students' understanding as it would not help to deeply assess their knowledge or ability to implement what they learned. In terms of the nature of the content provided to student teachers in these programs, Hussain indicated the lack of providing content-related courses (e.g., math, reading, writing). This might be attributed to the fact that preparation programs of Saudi teachers are categorically oriented and not content-oriented. This means that these programs focus more on the technical knowledge of providing special education services in terms of how to assess students' needs and plan for delivering the needed services. However, further investigation is needed in this area of research.

Certification requirements. In Saudi Arabia, until recently, the main and sole requirement for a special education teacher to be allowed to work with children with a disability was the holding of a bachelor's degree from a certified teacher preparation program. However, propelled by the passion for improving the quality of its special education teachers, the Ministry of Education issued new certification requirements that require teachers to hold at least a bachelor's degree and pass a disability content-related exam. In contrast with developed countries such as the United States, where special education teachers are tested in their capacity to teach specific content and to work with students who have specific disabilities, teachers in Saudi Arabia are tested in relation to the technical and factual knowledge related to running special education programs as well as the theoretical information they received during their 4-year preparation program (e.g.,

teaching strategies, learning theories, assessment knowledge). A review of the standards upon which teachers are tested for eligibility to teach elementary grades indicated that there are three different sets of standards leading to three different certifications (see Table 3).

First are the standards for early elementary grades teachers (National Center for Assessment, 2018), including 44 standards; 25% address general knowledge related to the history of the country and its political system; and 75% address different topics, such as student characteristics, Islam, Arabic language, assessment, teaching strategies, effective learning environments, and collaboration. Teachers are expected to pass a national exam on these standards to qualify for teaching early elementary grade students. *Second* are the standards for teachers of Arabic language/literature (National Center for Assessment, 2017a). Twenty-four standards cover a wide range of domains including syntax (29%), morphology (6%), literature (17%), poetry (3%), linguistics (5%), rhetoric/eloquence (13%), language skills (16%), and teaching strategies (11%). A close review of the content of the standards related to linguistic showed that it refers to knowledge of language development, phonics, and knowledge of using Arabic dictionaries. *Third* are the standards for special education teachers of students with LDs (National Center for Assessment, 2017b). There are 30 standards; 36% address the same general knowledge expected from the early elementary grades teachers (e.g., Saudi history, Saudi political system, and Islam), and 64% address knowledge of special education (nine standards) and specific knowledge of LDs (10 standards).

Table 3

Teaching Standards Addressed by the Teacher Certification Exam

Standards	<i>n</i>	Content	Presence of Knowledge of Basic Arabic Language Elements
Teachers of Early elementary grades	44	Saudi Arabia's history and structure of government; Student characteristics; content of the main subjects (Arabic, Math, Science, and Islam); teaching strategies; assessment; effective learning environment; involvement of families and local communities.	For teachers teaching reading in the general classroom, they are expected to have knowledge of Arabic morphology and syntax. Also, teachers are expected to have knowledge of using phonemic segmentation as a teaching strategy.
Teachers of Arabic Language	24	Syntax; Morphology; Literature; Poetry; Linguistics; Rhetoric and Eloquence; Language Skills; Teaching Strategies	The standards are heavily focused on the knowledge of Arabic syntax (37.5%). The knowledge of Arabic morphology is concerned with the knowledge of word roots and the use of a dictionary. Linguistic knowledge is focused on knowing the concept of language, language development, and phonetics. Language skills are defined as the knowledge of spelling and punctuation rules.

Table 3

Cont.

Standards	<i>n</i>	Content	Presence of Knowledge of Basic Arabic Language Elements
Special Education Teachers of Students with LDs	30	Saudi Arabia's history and structure of government; General concepts related to Special Education (e.g., IEP, behavioral intervention, continuum of service); General concepts related to LDs (e.g., nature, causes, characteristics, and services); General learning theories; Instructional planning; Assessment and evaluation for students with LDs.	The standards do not address any aspect of Arabic language knowledge (i.e., phonology, morphology, syntax, semantics, and pragmatics). Also, the standards do not address any content knowledge requirements for any subject, including reading and writing.

It is noteworthy to say that across all these different standards, it could be noticed how light is the emphasis on the knowledge of basic language elements. Except for the Arabic language teachers, who teach upper elementary and secondary grades, special education teachers and early elementary grade teachers are not required to show knowledge of Arabic phonology, morphology, or syntax, all of which are essential for developing reading skills.

Special Education Research and Teacher Knowledge

In a study that reviewed special education research in Saudi Arabia, Fehaid, Alshuayl, and Ryndak (2019) indicated that most of the reviewed special education publications (78%) appeared only between 2010 and 2016. Further, the majority of the reviewed studies (93%) were published by researchers affiliated with Saudi universities, indicating the essential role Saudi universities play in progressing the special education field, research, and provision of services. Additionally, the study noted that 97% of the reviewed studies utilized quantitative designs only, including surveys, experimental, and correlational studies. At the same time, qualitative and mixed methods designs were scarcely used in the reviewed publications, at 2.4% and 0.6, respectively.

For this dissertation, the data collected in Fehaid, Alshuayl, and Ryndak's (2019) study were further analyzed to explore patterns related to LDs research. There were 100 LDs-related studies between 1984 and 2016. Further analyses of the data from these studies indicate several findings. The majority of the published LDs studies were produced during the last 5 years of the reviewed publication period. Most of the LDs research targeted elementary grades (57%), using quantitative study designs. No studies

utilized qualitative, mixed methods, single subject, or case study designs. In terms of the use of intervention, 44% of the reviewed studies included interventions. Considering the topics of these studies, data indicated that disability profile, academics (e.g., reading, math, science), and special education services dominated the LDs publication representing 19%, 28%, and 14%, respectively. Research on special education teachers of students with LDs was represented with only eight studies; when these studies were reviewed, their focus was on topics not related to the what and how of teaching reading.

A broader view of the special education research, including LDs-related research for studies that investigated teachers' knowledge, revealed only four studies, and only one study included teachers of students with LDs. Aba-Hussain and Al-Hussain (2016) conducted a survey study investigating knowledge and level of application of co-teaching among 50-female special education teachers. Findings indicated high knowledge of co-teaching, although average use in everyday instruction. A closer look at the reported results showed that while the majority of teachers confirmed knowledge of the general assumptions associated with co-teaching (e.g., how it is formed, its purpose, and main requirements ensuring its success), teachers indicated that they lacked the understanding to differentiate between the various types of co-teaching (e.g., parallel, supportive, and alternative) and how to apply them effectively. It is noteworthy, however, to mention that statements included in the survey were developed in ways that did not test for teachers' knowledge, but rather sought their perceived knowledge related to co-teaching.

Other studies included a study conducted by Haimour and Obaidat (2013) in which they used a survey instrument to explore the knowledge of autism among 391

general and special education teachers in Jeddah, Saudi Arabia. Although special education teachers showed significantly higher performance on the survey compared to general education teachers, the percentage of correct responses for both groups ranged from 43 to 75%, indicating a lack of knowledge. Differences in performance were attributed to educational role (special vs. general), education level (e.g., bachelor, master), and experience of working with students with autism. Teachers who had special education background, master's degree, and more than 10-year working experience, scored significantly higher than other teachers. Another study is conducted by Alhossein (2016), who surveyed a sample of 333 general and special education on their knowledge and use of evidence-based practices (EBPs) for students with emotional and behavioral disorders. Findings indicated a strong correlation between the level of knowledge and the extent of use for EBPs among teachers. It also revealed that teachers possessed average to poor knowledge about EBPs with similar levels of use. Furthermore, teacher-mediated interventions received higher rates of implementation significantly higher than peer-mediated and self-mediated interventions. Finally, the impact of teachers' educational role, years of experience, and educational levels on the outcomes was investigated, revealing no significant impact. Finally, Abed, Pearson, Clarke, and Chambers (2014) conducted a mixed methods study that focused on evaluating teachers' knowledge about Attention Deficit Hyperactivity Disorder (ADHD). The study was composed of a questionnaire-based phase followed by a series of interviews conducted with a select number of teachers. The survey was administered to 54 teachers and focused on knowledge of ADHD, while the interviews included eight teachers and focused on

indicating sources from which teachers got their information about the disorder. Findings indicate teachers possessed significantly more knowledge on the characteristics of ADHD and poor knowledge of ADHD-related interventions. However, the overall performance of teachers on the survey indicated poor knowledge about ADHD, as evidenced by the correct response rate, which was 47%. Finally, university courses and media were the most cited by teachers as mediums from where they learn about ADHD.

The Purpose of This Study and the Research Questions

The literature review indicated how teachers, regardless of their certification type, teaching experience, country, and prior literacy preparation were found to have poor knowledge of basic language elements (e.g., phonemic awareness, syllabic knowledge, morphemic knowledge, spelling), all of which are important for effective reading teaching. This body of research is still emerging and has many paths yet to be explored.

Regarding Saudi Arabia, a comprehensive review of the literature showed the absence of studies investigating Arabic language knowledge among special and general education teachers. Therefore, the current study assumes its importance in becoming the first study to address the Arabic language knowledge (i.e., phonology knowledge, and morphology knowledge) among Saudi reading teachers.

This dissertation adopted an explanatory sequential mixed methods design to explore knowledge Arabic morphology and phonology (KAMP), as well as the perception of language knowledge and its role in reading and reading disabilities among Saudi general and special education teachers teaching reading for early elementary grade

students with reading disabilities (RDs). The study aimed to answer the following questions:

1. What is the difference between special and general classroom teachers on their knowledge of Arabic morphology and phonology as depicted by the KAMP?
2. What is the difference between special and general classroom teachers in terms of how they perceive their knowledge of Arabic morphology and phonology?
3. What is the difference between general and special education teachers on their knowledge of Arabic morphology and phonology, as measured by the KAMP, based on their level of teaching experience?
4. How do special education teachers describe the role of language knowledge in the learning of reading for their students, and do their described instructional practices reflect an appreciation of this role?

Chapter Summary

The reading phenomenon is very complex, and its processes and elements are hard to define. This chapter utilized the SVR theory as a medium for the conceptualization of reading, and the reasons why some students continue to fail or struggle with reading. Through the review of the literature related to reading, SVR theory, and reading disability, it appeared that the role of language knowledge is central in reading. Students must possess sufficient knowledge of basic language structures, which is only affordable through explicit reading instruction. Since teachers come to play

an essential role in the delivery of effective reading instruction, they have a huge influence on the student reading process, requiring that they possess sufficient language knowledge. Findings from the reported literature suggest that teachers across grade levels, disciplines, and countries, regardless of prior teaching experiences and preparation, have poor language knowledge. Concerning Saudi Arabia, teachers' knowledge of basic Arabic language elements has yet to be investigated. Therefore, this study is timely and needed, and is to contribute to the general body of literature at the conceptual and methodological levels.

CHAPTER III

METHODOLOGY

This chapter starts with a discussion of the different research methods (e.g., aims, paradigms, tools, and analysis techniques), leading to an extended discussion of the mixed designs methodology (e.g., purpose, types, theoretical drives, and justification for use). Next, the chapter delineates the selected study design, describes the participants and sampling procedures, identifies the data collection tools, and explains the procedures for ensuring the validity and reliability of the data collection tools.

The Different Study Designs

The selection of the research design is an essential step for conducting effective and transformative research. The selection of an appropriate research design should be based on the nature of the research problem, as well as the researchers' interests and skills (Creswell, 2014). Some research problems might be well-suited for only quantitative designs, some might be well-suited for qualitative designs, and others might require a combination of quantitative and qualitative methods.

Quantitative and qualitative designs differ on their purpose, rationale, process, data collection, and data analysis tools, as well as the research questions they are appropriate to answer. On the one hand, quantitative designs are based on the research paradigm of positivism, which suggests reality to take one shape that can be discovered through direct observation (Teddlie & Tashakkori, 2009; Wellington, 2015). It purposes

to generalizing results about an entire population through rigorous testing of research hypotheses and the quantitative analysis of the data (Kumar, 2010). Thus, it requires objectivity from the researcher, for its results to be credible and trustworthy, and researchers using quantitative designs are expected to collect data using valid and reliable testing tools. There are different types of quantitative research: experimental, quasi-experimental, or non-experimental. Differences between these types are based on factors such as the sampling techniques, the involvement of treatment, and the ability to draw conclusions (e.g., causality vs. correlation).

On the other hand, qualitative designs are based on the belief that knowledge is socially constructed through exploring perspectives and development of interpretations (Wellington, 2015). The interpretivist paradigm is the guiding principle of qualitative methods, which suggests the reality of being multi-faceted and subjective (Sale, Lohfeld, & Brazil, 2002). Therefore, it uses thick descriptions and deductive analysis, instead of numbers and inductive reasoning, to create an in-depth understanding of the studied phenomenon (Wiersma & Jurs, 2008). Qualitative research may take different forms, including ethnographic approach, grounded theory approach, phenomenological approach, narrative inquiry, and case study. Data collection tools may include interviews, observations, field notes, review of documents, and comparative analysis.

Mixed Methods Designs

In the last 2 decades, combining quantitative and qualitative methods in a single research study is increasing (Collins, Onwuegbuzie, & Sutton, 2006). Some researchers are defining this use as a third research method (Hussein, 2009). Combining, or mixing,

quantitative and qualitative methods is believed to be powerful, as it combines the strengths of the two distinctive designs. It is believed that mixed methods research “provide[s] the most complete analysis of complex problems” (Creswell & Clark, 2017, p. 23). For example, a researcher, using a quantitative design, might find out that the results from the exam or questionnaire are insufficient to explain the studied problem requiring further and in-depth examination, which may come in the form of interviews or on-site observations. As another example, a researcher might need to build familiarity and a close understanding of the research problem for designing a more sensitive and reliable survey tool, per se. For that purpose, the researcher might use field notes, observations, or interviews, to gain a better understanding of the population and the phenomena under study before starting the survey. Therefore, using a mix of quantitative and qualitative methods is empowering and might help to lift the limitations imposed from the use of a single method over another.

Mixed methods research is based on a philosophy of pragmatism, which suggests that researchers are not forced to trade on the benefits of one method for using another one; instead, they are empowered with the right to use a combination of methods, ensuring that the research questions are addressed fully and appropriately (Creswell & Clark, 2017). However, it should be noted that although mixed methods designs are powerful and empowering, researchers should be aware that employing them is effortful, time-consuming, and requires efficacy on both qualitative and quantitative methodologies (Teddle & Tashakkori, 2003). Researchers need more than a strong rationale to adopt a mixed methods design; if the researcher lacks the time or the knowledge necessary for

mixed methods designs, it is doubtful they will produce meaningful and transformative research.

In mixed methods research, as defined by Johnson, Onwuegbuzie, and Turner (2005), the mixing of quantitative and qualitative methods is guided by the research questions and purpose, determining the course of the study. When developing a mixed methods study, the researcher makes decisions regarding types and phasing of the selected quantitative and qualitative techniques. Morse and Niehaus (2016) noted that effective mixed methods designs require specifying the purpose of the mixed methods design, the overall theoretical drive, the timing, and the point of integration. These specifications should be considered carefully and in alignment with one another. Knowing the purpose of integration would suggest the primary method and the dependent method; knowing the purpose of integration and the theoretical drive would lead to identifying the annexation time or when each phase to be started; this would lead then to specifying the point of integration, or when the data from the two methods would be combined.

The Purpose of the Design

Greene et al. (1989) specified five different purposes that justify the adaptation of a mixed methods design; these justifications included seeking corroboration between quantitative and qualitative data (triangulation), seeking clarification of the results generated from one method using the results of the other method (complementarity), using the results from one method to develop the other method (development), seeking for contradictions and new perspectives (initiation), and seeking to expand on the results

generated from one method using the other (expansion). Bryman (2006) noted that these justifications are still in use today.

The Theoretical Drive

Theoretical drive, on the other hand, is best conceptualized in the taxonomy suggested by Creswell and Clark (2017) that differentiate between explanatory and exploratory designs. In explanatory designs, the quantitative phase of the study is conducted first along with its related data analysis before conducting the qualitative phase, which is then used to explain or expand on the findings from the quantitative phase. Exploratory designs are the opposite of the explanatory designs, as it requires building the quantitative phase based in the findings generated from the qualitative phase attempting to base the quantitative phase on a solid and clear understanding of the phenomenon under study. After identifying the purpose and the theoretical drive, the researcher might decide to time the implementation of each phase.

The Timing of Phases

Creswell and Clark (2017) differentiate between convergent design (where quantitative and qualitative phases are enacted simultaneously), and sequential designs (where one phase is started after the end of the other phase). Schoonenboom and Johnson (2017), on the other hand, suggest a typology that considers not only the timing of phases but also the level of independence; accordingly, they suggested four different types, including concurrent-dependent design, concurrent-independent design, sequential-dependent design, and sequential-independent design. The level of dependency could be

conceptualized in line with the point of integration identified by Morse and Niehaus (2016) as the fourth factor of effective mixed methods design.

The Points of Integration

Morse and Niehaus (2016) suggested two main points of interface, which include the analytic point and the resulting point, meaning that data from quantitative and qualitative methods could be combined during the data analysis level, and/or the data reporting level. What Schoonenboom and Johnson (2017) came to add was that differentiating between concurrent and sequential design should not suggest that the two methods are more interfering within the concurrent designs and less interfering within the sequential design. The interaction between quantitative and qualitative designs might become complicated and continue throughout the course of the mixed methods study, starting from the planning phase and across the development of data collection tools, data analysis, data synthesis, and the reporting of the results. Sometimes the researcher can plan and predict exactly where and how each point of interference is occurring, and sometimes the study demands unplanned interaction between the two designs. Therefore, Creswell and Clark (2017) noted two main ways for the quantitative and qualitative methods to be incorporated—the fixed mixed methods design, where all the decisions about the methods are made before the start of the study, and the emergent design, where the decisions on the methods are developed in the reflection of the process of the study.

This Study Design

This study adopted an explanatory sequential mixed methods design. It is explanatory sequential design because the study started with a quantitative phase

followed by a qualitative phase; in this sense, the qualitative phase helped explain the findings generated from the quantitative design, allowing for an effective interpretation of the results. Accordingly, the purpose of the adapted mixed method design was to seek *complementarity*.

There were two points of interaction between quantitative and qualitative designs. The first point of interface was when the results of the quantitative phase were used to determine some of the specifications related to the qualitative phase, including generating the interview questions and sampling participants. The second point of interface was when the data from the quantitative and qualitative phases were combined in the discussion of the study results.

The quantitative phase of the study utilized a survey designed to address teachers' knowledge of Arabic morphology and phonology. In the qualitative phase, semi-structured interviews were used to address how teachers described language knowledge and its role in the process of reading, as well as the instructional practices they devise to address their students' reading needs.

Research Questions

The quantitative and qualitative phases of this dissertation were guided by four research questions, as follows:

1. What is the difference between special and general classroom teachers on their knowledge of Arabic morphology and phonology, as depicted by the KAMP?

2. What is the difference between special and general classroom teachers in terms of how they perceive their knowledge of Arabic morphology and phonology?
3. What is the difference between general and special education teachers on their knowledge of Arabic morphology and phonology, as measured by the KAMP, based on their level of teaching experience?
4. How do special education teachers describe the role of language knowledge in the learning of reading for their students, and do their described instructional practices reflect an appreciation of this role?

Participants

Participants in this study were early elementary grade teachers of students with learning disabilities (LDs), including general classrooms and special education teacher. The target population was teachers located in Riyadh city, the capital of Saudi Arabia. Early elementary grades, namely the first, second, and third grades, are taught by general education teachers (GETs) who have earned at least a bachelor's degree in Arabic literature; the GETs are also encouraged, but not required, to acquire a certificate in teaching and children developmental theories. On the other hand, the special education program for LDs is a resource room that is attached to an elementary school, taught by a certified special education teacher (SETs), and uses pull-outs to provide special education services (General Secretariat of Special Education, 2015). The SETs of students with LDs are targeted in this study for the essential role they play on the delivery of special education services. On the other hand, the GETs were targeted because students with LDs

spend the majority of their day in the general education classroom. For that reason, GETs and SETs, alike, were expected to have knowledge of language structure and awareness of the factors that impact the reading for the needs of students with LDs to be served appropriately.

Sampling Procedures

Riyadh city was chosen for this study because it hosts a considerable percentage of the GETs and SETs. According to the Riyadh School District (2018), Riyadh hosts 17.29% of the entire Saudi student population, around 13% of the entire elementary teachers' population, and more than 24% of the total special education programs for LD students. In Riyadh, there are 1053 resource rooms for students with LDs, among which are 803 in the elementary grade setting (Riyadh School District, 2018). For estimating the population parameters, it should be noted that each elementary school is represented with one LDs program that is mostly served by one SET, and three different early grade levels mostly served by six GETs. Accordingly, the population could be estimated to exceed 5,600 special and general classroom teachers.

Sampling was conducted at the school level, meaning that general and special education teachers from schools that have a special education program—resource room for students with LDs—were eligible for participation. Accordingly, schools that were not equipped with special education services for students with LDs were excluded from participation. This decreased the number of possible invitations, but helped to control for the impact of the school environment on teachers' reading-related knowledge; teachers working on different school setting might have unequal opportunities for expanded

knowledge about LDs. When limiting participation to only schools with LDs programs, we might ensure that teachers participating in this study have some familiarity with at least the term learning disabilities.

Following approval from the Saudi Ministry of Education to conduct the study (Appendix A), the researcher used a service provided by the ministry through its Research and Innovation Sector (RIS) to distribute the survey to the targeted population. Through the Saudi Ministry of Education, the RIS has access to vast data on Saudi teachers, students, schools, educational services and programs, and special education, which is updated every year. Through RIS's access, the researcher was able to sample from the population of general and special education teachers who met the inclusion criteria (i.e., teaching early elementary grades in schools with special education programs for students with learning disabilities in Riyadh city).

The sampling was based on teachers' personal phone numbers that are stored in the systems of the Saudi Ministry of Education. The personal phone numbers were used as the sampling frame because all teachers need to have a working cell phone number to frequently log into the Ministry's educational systems for instructional purposes. For example, there is a Noor system, which is used by special and general classroom teachers to update student's weekly progress and achieved academic goals and test scores. For teachers to access this service, they need to receive an access code for each time they log into the system.

Sampling Size

This study has two research phases: the quantitative phase and the qualitative phase. Therefore, the number of participants and the process of selection are identified differently. For the quantitative phase, the minimal sample size required for conducting the quantitative phase was determined using the G*power package (Faul, Erdfelder, Lang, & Buchner, 2007), which requires specifying the desired significance level, the confidence level, and the effect size. The significance level is referred to as the alpha level, or the probability of committing a type I error or falsely rejecting the null hypothesis (Vogt & Johnson, 2011). The confidence level indicates that the sampled mean value lies within the normal distribution of the true population value (Israel, 1992). The effect size refers to the magnitude of means difference between groups (Sullivan & Feinn, 2012). Following the suggestion from J. Cohen (1988), the values of .05, .95, and .30 were set for alpha level, confidence level, and effect size, respectively. This resulted in setting the minimum sample size for the quantitative phase at 580 general and special education teachers. It is preferred to have an equal number of participants for each teacher group; however, it cannot be guaranteed since the ratio of GETs to SETs ranges between 3:1 and 6:1. This was evident from the pilot study (Fehaid, Cavanaugh, & Kamhi, 2019), which was represented by a more general education than special education teachers (the ratio was 2:1).

Considering the low response rate associated with survey research, it was suggested that the number of targeted teachers for participation is increased to ensure an expected or desired response rate. A response rate of 50% is both expected and desired. It

is expected for two reasons. First, during the pilot study, the researcher targeted more than 150 special and general classroom teachers, and achieved a response rate of 47%, without any use of incentives. Second, the researcher is planning to use some incentives to increase participation. For these two reasons, a sample size of 1200 teachers perceived to be a reasonable aim for the sampling phase.

For the qualitative phase, purposeful sampling was utilized to draw a representative sample of teachers. The sample for the qualitative phase was chosen from the participants in the quantitative phase, pending their consent to be included. This technique is suggested for studies that employ an explanatory sequential mixed method design for its potential to help in achieving complementarity (Creswell & Clark, 2017), which was the purpose of adopting this design. The number of participants in the qualitative research depends on achieving saturation or redundancy (Merriam & Tisdell, 2015). Interviews are stopped only when no new themes were emerging. The typical number of interviews suggested to produce saturation is eight to 12 interviews (e.g., Guest, Bunce, & Johnson, 2006; Knox & Burkard, 2009). For this study, eight special education teachers participated in the interviews. Special education teachers who showed a willingness to participate were divided into two groups based on their performance on the KAMP (i.e., above or below the 50th percentile); see Table 4. This allowed an equal representation of teachers with high and poor language knowledge.

Table 4

Selection Criteria for Participants in the Interviews

	Above 50th Percentile	Below 50th Percentile
Special Education Teachers	4	4

Data Collection

The data for this study was collected using two data collection tools. During the quantitative phase, a survey was utilized to collect data on teachers' knowledge of Arabic morphology and phonology. The survey was constructed to include two sections.

Section-A: Background and Personal Information (BPI); and Section-B: Teachers' knowledge of Arabic morphology and phonology (KAMP).

During the qualitative phase, the researcher used semi-structured interviews to collect data on how teachers perceive language knowledge and its role in the development of reading, as well as how they use reading instruction to address the needs of students with reading disabilities. The semi-structured interview was preferred because it is less rigid, compared to structured interviews, and allows for collecting only relevant information, compared to the unstructured interviews (Denscombe, 2014).

Survey: Section-A: Background and Personal Information (BPI)

The BPI section helped to collect information on teachers' demographics including certification type (i.e., general classroom teacher, or special education teacher), gender (i.e., male, or female), highest educational degree (i.e., bachelor, master, and doctorate), levels of teaching experience (i.e., defined by the number of years teaching as little: < 5, average: 5-10, or high: > 10), and level of confidence to address the

instructional needs of students with reading disabilities (i.e., ranges from no confidence to very high confidence). Furthermore, the BPI included items for teachers to rate their perceived knowledge using a rating scale ranging from having “no knowledge” to that of having “very high knowledge.” In this regard, teachers rated their perceived phonology knowledge and perceived morphology knowledge.

Survey: Section-B: The Knowledge of Arabic Morphology and Phonology (KAMP)

The KAMP was designed through a comprehensive instrumentation process. This process was completed in Fehaid, Cavanaugh, and Kamhi (2019); however, a summary of this process is provided in a later section, and the related materials are presented in Appendix B. The KAMP addressed general language terminologies (8%), phonology (67.5%), and morphology (24.3%). In KAMP, there are three items related to defining language terminologies, 25 items related to phonology, and nine items related to morphology. Phonology is addressed using five tasks: a task on identifying voiced and voiceless sounds (two items), two tasks on phonemic segmentation (11 items), and two tasks on counting syllables (12 items). Morphology is addressed using two tasks that include counting morphemes (four items) and matching words based on the number of morphemes (five items). Across all items in the KAMP, the multiple-choice format is adopted. For each item, a list of options is provided to include one right answer and a list of distractors. Responses are counted as either right (1 point) or wrong (0 points). Table 5 provides a detailed description of the KAMP sections and tasks.

Table 5

Description of KAMP's Main Sections and Tasks

Title	Type of the Task	Number of items	Description
General knowledge	Choosing the correct option from a list of options	3	The task requires identifying the right definition for phonemic awareness, phonemes, morphemes, and homographs.
Phonology	Voiced and voiceless sounds	2	The task requires identifying the sound that does not belong in given lists of voiced or voiceless sounds.
	Phoneme Segmentation (a)	5	The task requires identifying the correct number of phonemes for a list of given words.
	Phoneme Segmentation (b)	6	The task requires identifying the word that has a specified number of phonemes.
	Counting syllables (a)	6	The task requires identifying the correct number of syllables for a given list of words.
	Counting syllables (b)	6	The task requires identifying the words that have a specified number of syllables.
Morphology	Counting morphemes	4	The task requires identifying the number of morphemes for a given list of words.
	Matching words based on number of morphemic units	5	The task requires using a list of word options to identify the word that has the number of morphemes similar to that of a primary given word

Semi-structured Interviews

Two technical decisions should be addressed when using interviewing as a data collection tool. The first decision is related to the type of interviews, individual interviews, or group interviews (Merriam & Tisdell, 2015). The second decision is

related to the structure of the interview (i.e., unstructured, semi-structured, and structured interview). The level of the imposed structure determines the flow of the interview, as well as the depth and cohesiveness of the collected data. Highly structured interviews might increase cohesiveness, while unstructured interviews might allow for in-depth exploration. This study adopted one-to-one semi-structured interviews; this allowed for attending the interviews with a pre-determined set of questions, and at the same time, it allowed for asking follow-up questions. Individual perceptions of the role of language knowledge on developing reading and the experiences related to the teaching of reading are valuable information for richness and explaining the results of the survey. The interviews were recorded and then transcribed for analysis. Also, in addition to using an interview guide, the interview questions were reviewed, evaluated, and approved by an expert in reading disabilities.

Development and Pilot Testing of the Data Collection Tools

The process of developing this study's data collection tools was conducted separately for the survey instrument and the semi-structured interviews. First, the development of the survey instrument was completed in a three-step process. The first step involved using the literature related to teachers' language knowledge to develop the test specifications for the domains and items of the survey, which resulted in the initial version of the KAMP. Step 2 was to ensure the validity of the KAMP using content validity and face validity techniques. Step 3 was to pilot the KAMP to a representative sample of teachers, leading to establishing its reliability through item analysis techniques. It is noteworthy that all the three steps were completed and presented in Fehaid,

Cavanaugh, and Kamhi (2019), which served as one of the building blocks of this dissertation. Second, the interview protocol used in the semi-structured interviews was developed through face and translation validity techniques. Accordingly, the interview protocol was developed and revised based on experts' feedback, and the feedback from piloting to a representative sample. The outcomes of this process, for both the survey and the interviews, are presented, accordingly, in the following sections.

Developing the Survey Specifications

A comprehensive review of the literature related to how teachers' language knowledge is examined was completed thoroughly within Chapter II of this dissertation (pages 32–39); see also Fehaid, Cavanaugh, & Kamhi, 2019). However, the overall conclusion from that process suggests that most of the reviewed language knowledge surveys included items related to only phonology and morphology. Furthermore, all the reviewed surveys tend to include more phonology-related items (70-90%) than morphology related items (10-30%).

Therefore, although this study is the first to examine knowledge of Arabic language morphology and phonology among Saudi early elementary reading teachers, which demands the development of relevant test specifications and test items, the researcher used the questioning styles and layout of items techniques that were adopted in the literature. Furthermore, although the KAMP was developed and presented to teachers using Arabic alphabetic, a modified version that has the test items written using the International Phonetic Alphabetic (Hassan & Heselwood, 2011) was included to make the KAMP accessible for non-Arabic speakers (see Appendix D).

Developing Survey Validity

The validity of the test is a very important aspect that should be considered when developing assessment tools. This concept is associated with the need to ensure that the test is measuring what is intended to measure (Drost, 2011). There are many types of construct validity, such as content validity, face validity, ecological validity, translation validity, and criterion-related validity (Drost, 2011; Vogt & Johnson, 2011). During the development of the KAMP, three types of validity were utilized, including translation validity, face validity, and content validity.

Translation validity. Since Arabic is the primary language for the targeted population, the translation of the survey from English to Arabic was essential. This step was considered to be essential, as well as sensitive. It is essential since it is the only way to provide the participants with direct access to the test, increasing authenticity and validity. At the same time, the quality of translation is critical, as poor translation leads to inaccurate results. Therefore, Prieto (1992) recommended using more than one technique to complete the translation, such as back-translation, bilingual samples, a panel of experts, and piloting of the instrument. Translation using multiple techniques is suggested to have provided more consistency between the original and translated versions (Cha, Kim, & Erlen, 2007).

For the KAMP, back-translation and pilot testing were combinedly used. Accordingly, the English version of the survey was translated to Arabic by a professor majoring in linguistics and Arabic. Then, the translated copy was reviewed by the researcher before it was sent to another professor majoring in TESOL, to translate it back

to English. The purpose of the back-translation technique was to confirm the accuracy of the translation (Shigenobu, 2007). Therefore, copies of the English-original survey and the English-translated survey were sent to a third professor majoring in English and Applied Linguistics, who reviewed the two versions to address any differences. The final version of the translated survey was then prepared and piloted to a representative sample of Saudi early elementary special and general education teachers. It should be noted that the KAMP had to be designed in English first so the committee members could provide insightful feedback on the survey, optimizing its relevance and comprehensiveness.

Face validity. Face validity is concerned with the appearance of the instrument from the view of the test-takers (Nevo, 1985). It examines the clarity and appropriateness of the instrument's content and layout of items from the perspective of the targeted population (Thomas, Hathaway, & Arheart, 1992). Experts and test-takers might rate the validity of items differently, producing contradicting opinions (Holden & Jackson, 1981). For the BPI and KAMP section of the survey, cognitive interviews were conducted whereby one special education teacher and one general education teacher were individually involved in answering the survey using the think-aloud technique. The cognitive interview technique is suggested to help capture the cognitive process teachers endure when answering the survey items (Desimone, Carlson, & Floch, 2004). During each interview, the researcher drew notes describing the teacher's thoughts, views, and answers for each item, asking teachers for more clarifications when needed. At the end of each interview, the researcher asked the teacher to share their opinion about the survey and suggest ways to improve it. This process resulted in the rewording of a few items and

the addition of descriptions to some of the KAMP's tasks. The outcome of this practice is suggested to help ensure that the survey is valid and reliable in examining what it is meant to examine and that participants' responses are not impacted by misunderstanding or ambiguity (Willis, Royston, & Bercini, 1991).

Content validity. Content validity is concerned with measuring how the elements of the test are relevant to the targeted domains (Lawshe, 1975). This includes individual items, response formats, and instructions (Haynes, Richard, & Kubany, 1995). There are two ways to ensure the content validity of a test/questionnaire; the first is to ask questions about the scale to a group of experts yielding qualitative data that helps to make necessary adjustments; the second is to involve the experts on a process of rating the relevance of the scale's items producing quantitate proportions that reflect the validity of the content of the test/questionnaire (Drost, 2011). The content validity of the KAMP was developed through a process of two steps, described as follows.

The first step was to generate a relevant pool of items, along with an ample description of the organization and the representation of these items within domains, as well as how the participants are expected to respond to each item. For the KAMP, these specifications were developed in light of a review of the literature on teachers' language knowledge, including analysis of the nature and proportions of language tasks teachers were expected to complete within each language survey; the outcomes of this analysis were presented in pages 32-39 of this dissertation.

The second step involved the use of the content validity index (CVI) techniques. The CVI provides a way for engaging content experts in a process where they rate the

relevance of the questionnaire items using approval and disapproval statements (e.g., yes, and no), or ranking statements (e.g., high valid, moderate valid, and low valid; Aiken, 1980). The CVI is used to quantify experts' judgments and provide coefficient alpha leading to statistical-based decisions that determine the relevance of the survey to measure the intended construct (Polit & Beck, 2006). As suggested by Lynn (1986), two CVIs should be conducted: one that examines the relevance of each item and another that determines the relevance of the questionnaire as a whole. Lynn also suggests involving five to ten experts to control variance in responses.

In this regard, eight university professors in linguistics and Arabic literature were invited to rate the relevance of the items and tasks in KAMP to examine knowledge of Arabic morphology and phonology among special and general classroom teachers teaching reading for students with reading disabilities at early elementary grades. Ratings of KAMP were conducted at the item level and the task level (see Table 6). Accordingly, the language tasks (e.g., counting phonemes, counting syllables, counting morphemes) were rated for their appropriateness to examine teachers' language knowledge, and individual items were rated for their relatedness to the knowledge of Arabic morphology and phonology.

Table 6

Content Validity Index of the KAMP Section

Items	i-CVI	Items	i-CVI	Items	i-CVI
i1	1	i16	1	i31	1
i2	1	i17	1	i32	1
i3	1	i18	0.875	i33	1
i4	1	i19	0.75	i34	1
i5	0.75	i20	0.875	i35	1
i6	0.75	i21	0.875	i36	1
i7	0.75	i22	1	i37	1
i8	0.75	i23	1	i38	1
i9	1	i24	1	i39	0.875
i10	1	i25	1	i40	0.875
i11	1	i26	1	i41	0.875
i12	1	i27	1	i42	0.875
i13	1	i28	1	i43	0.875
i14	1	i29	1		
i15	1	i30	1		
KAMP Items					
			S-CVI/Ave		0.95
			Total Agreement		30
			S-CVI/UA		0.70
KAMP Tasks					
			S-CVI/Ave		0.97
			Total Agreement		3
			S-CVI/Ave		0.75

For each of the two CVI activities, raters were provided with a modified version of KAMP; each item was accompanied with a 4-point rating scale that asked the rater to determine the level of relatedness to the corresponding knowledge domain (Lynn, 1986).

Then, two CVI proportions were calculated for KAMP. The S-CVI/Average is obtained when averaging the sum of the CVIs for items (i-CVI):

$$\frac{\sum i1_{cvi} + i2_{cvi} + \dots + in_{cvi}}{n_i}$$

The second proportion refers to the percentage of items that received a unanimous agreement across all the raters (S-CVI/UA). This proportion was calculated by dividing the number of items received ratings of 3 or 4, by the total number of items in the scale. Proceeding with this understanding, the original version of the KAMP has 65 items organized within six general tasks. For any item to be approved for subsequence analyses, it should have received a CVI of 0.75 or more (Yaghmaie, 2003), and thus, items scoring lower than this threshold were eliminated.

The CVI process decreased the items in KAMP from 65 to 43. The content validity index for the KAMP indicated that KAMP's items had an S-CVI of .95, and KAMP's tasks had an S-CVI of .97; both indicated high and were accepted (Polit & Beck, 2006). Also, the unanimous agreement (S-CVI/UA) was achieved for 70% of the KAMP's items, and 75% of the KAMP's tasks, also considered acceptable.

Piloting the Survey

Following approval from a small school district in Saudi Arabia and UNCG's IRB to conduct the pilot study, an online version of the survey was developed using Qualtrics and shared with a school superintendent, who disseminated the survey link between a group of general and special education teachers of students with reading disabilities at elementary grades. The total number of teachers who received the link to the survey was

150 teachers, and only 71 teachers completed the survey, giving a response rate of 47%.

Table 7 provides the demographics of the participants.

Table 7

Summary of Demographic Information of the Participants in the Pilot Study

Variable	Categories	<i>n</i>	%
Specialization	General Education	51	71.8
	Special Education	20	28.2
Gender	Male	32	45.1
	Female	39	54.9
Highest Educational Degree	Bachelor	64	
	Master	7	90.1
	Doctorate	0	9.9
Years of Teaching Experience	1-2 years	6	8.5
	3-5 years	6	8.5
	6-10 years	16	22.5
	11-15 years	10	41.1
	More than 15 years	33	46.5

Establishing the Reliability of the Survey

Establishing the reliability of a scale/questionnaire is essential for accurate interpretation of its outcomes. “Reliability is the extent to which measurements are repeatable—when different persons perform the measurements, on different occasions, under different conditions, with supposedly alternative instruments which measure the same thing” (Drost, 2011, p. 106). Reliability is an indication of the consistency of the scale/measurement over time (Howell, 2012). Each time a test-taker receives a different score in a test, irrelevant to their state of knowledge, the test is considered unreliable.

Reliability of a measurement test can be evaluated based on three aspects; stability of the test, which is evaluated using test-retest technique; equivalence of the test, which investigates the correlation between different forms of the test that are supposedly testing the same trait; and internal consistency, which detects the correlation between the test items using techniques such as split-half approach, interrater reliability, and Cronbach alpha estimation (Drost, 2011).

For this dissertation, the Cronbach alpha was used to determine the reliability of the KAMP test using the SPSS.v26 software package. The correlation coefficient ranges between 0 and 1, and the closer the coefficient is to 1.00, the higher the reliability it indicates. For the KAMP, Cronbach alpha was calculated at .714, which is considered acceptable (Lance, Butts, & Michels, 2006). Cronbach's alpha is affected by different factors, such as the number of items and the quality of intercorrelation (Tavakol & Dennick, 2011). In the case of KAMP, although it is a low-stake test under development, an effort was made to enhance its reliability using other techniques such as reviewing statistics related to inter-item correlations and corrected item-total correlations. Furthermore, information derived from these techniques, aided with information from the item analysis, was used to revise KAMP's items before starting the data collection in this dissertation.

Inter-item correlation analysis. Correlations are reported using coefficients that range between -1 to +1; J. Cohen (1988) suggested interpreting correlations as either small ($\pm.10$ to $\pm.29$), medium ($\pm.30$ to $\pm.49$), or large ($\pm.50$ to $\pm.1.0$). Theoretically, when the items are assessing the same latent variable, the positive medium and large

correlations are expected; and when the items are measuring different and unrelated latent variables, the low or negative medium and large correlations are expected. On the other hand, corrected item-total correlation, sometimes called the point-biserial correlation “pb(r),” refers to the concept of computing the correlation between “an item and the total test of which the item is a part” (Henrysson, 1963, p. 211). It is suggested to use when studying the correlation between a dichotomous item/variable (where the outcome is 0 or 1) and a continuous variable (Demirtas & Hedeker, 2016; Kornbrot, 2005). In the case of KAMP, participant responses to items are recorded in values of “0” for the wrong answers, and “1” for the right answers, and the maximum ranges from 0-43. Therefore, it was appropriate to use pb(r) to detect the internal consistency between items in KAMP. When using the pb(r), the correlation between each item in the test and the final scores a student received in performing other items is analyzed to indicate how the item discriminates between poor and high performance. An item with low pb(r) indicates that more poor performers answered the item correctly than high performers (Varma, 2006). It is suggested that for the scale to have good internal consistency, items in the scale should have a pb(r) of .20 or more (Wells & Wollack, 2003). Items with low pb(r) are reexamined for possible wording or presentation issues (Varma, 2006).

The inter-item correlation matrix and the index of the corrected item-total correlation were generated using the SPSS.v26 statistical package. Starting with the inter-item correlation matrix, the researcher draws notes on the items that showed low or negative correlations. Next, the pb(r) coefficients reported for each item is reviewed to indicate items that failed to meet the 0.20 limit. However, although it is suggested that

items with $pb(r)$ lower than 0.20 should be eliminated, the researcher decided to preserve items that were slightly lower than 0.20 to undergo item response analysis, taking into account that the KAMP is low-stake and newly developed. Therefore, items with $pb(r)$ that is slightly lower than 0.20 were kept for reexamination. On the other hand, items with $pb(r)$ that is negative or close to zero were discarded from the test. This resulted in eliminating six items from the KAMP scale (i.e., i4, i6, i8, i13, i36, and i37). Consequently, KAMP's Cronbach alpha of reliability increased from .714 to .765.

Items response analysis. Items analysis techniques are powerful for enhancing the reliability of scales (Quaigrain & Arhin, 2017). Among these techniques are Item Facility (IF), Item Discrimination (ID), and the Distractor Efficiency (DE). The test items in KAMP were analyzed to report the quality of the test using IF, DI, and DE techniques. For that purpose, the Laboratory of Educational Research Test Analysis Package (Lertap) was used. Lertap is a program that is based on an Excel spreadsheet and designed with statistical tools appropriate for conducting reliability and item analyses (Carr, 2004; Nelson, 2001). Lertap was used to report on the IF, DI, and DE for the KAMP.

Item facility. The FI indicates the percentage of students answering the item correctly (Matlock-Hetzel, 1997). The FI is presented in percentages that range from 0 to 100%. For an item to be considered at an appropriate difficulty level, it is preferred to have an FI ranges between .3 and .7 (Brown, 2009; Carr, 2011). Using Lertap, the overall IF for the KAMP was .37, indicating an acceptable level of difficulty. As shown in Table 8, the KAMP contains items with easy (11%), average (43%), and high (46%) difficulty levels.

Table 8

Summary of the Item Analysis on KAMP

	Analysis Type	Items	%
IF	Easy	11, 18, 22, 39	10.8
	Average	2, 3, 5, 14, 21, 23, 24, 26, 27, 28, 29, 31, 32, 33, 40, 42	43.2
	High	1, 7, 9, 10, 12, 15, 16, 17, 19, 20, 25, 30, 34, 35, 38, 41, 43	45.9
ID	Poor	1, 5, 14, 18, 23, 31, 39	18.9
	Acceptable	2, 3, 9, 15, 16, 17, 22, 32, 34, 35, 38, 43	32.4
	Good	7, 11, 19, 20, 28, 30, 33, 40, 41	24.3
	Excellent	10, 12, 21, 24, 25, 26, 27, 29, 42	24.3
DE	Functioning	3, 5, 7, 12, 14, 15, 16, 17, 19, 20, 27, 28, 29, 30, 31, 32, 33, 34, 35, 38, 40, 41, 42, 43	64.9
	Un-Functioning	1, 2, 9, 10, 11, 18, 21, 22, 23, 24, 25, 26, 39	35.1

Although the FI for the KAMP is within the preferred range (0.3–0.7), the test has some tendency to be difficult, evident by the fact that it has more hard items than easy or average. However, we should consider the fact that KAMP is a low-stake test under development. Also, the majority of studies on teachers' knowledge of basic language elements, reported in Chapter II of this dissertation, indicate that teachers are characterized by poor knowledge. Nevertheless, items with high difficulty were considered for further analysis using DE techniques.

Item discrimination. The ID is used to determine the effectiveness of items to discriminate between poor and high performers. The ID is reported on values range between 0 and 1. Each item is analyzed separately by comparing the performance of the

upper 27th percentile with the performance of the lower 27th percentile. An item with a good ID is supposed to be correctly answered by more high performers than poor performers. Generally, items are categorized based on their ID to be poor ($DI < .15$), acceptable ($.15 < ID < .24$), good ($.24 < ID < .35$), and excellent ($ID > .35$; Hingorjo & Jaleel, 2012; Mehjabeen et al., 2017; Mehta & Mokhasi, 2014). As shown in Figure 3, the KAMP has 7-items with poor ID (19%), 11-items with acceptable DI (33%), 9-items with good DI (24%), and 9-items with excellent ID (24%). Although the majority of the items in KAMP show acceptable to excellent ability to discriminate between high and poor performance, items with poor ID were considered for further analysis using the information provided from the DE analysis.

Distractor efficiency. The DE provides a way for analyzing the internal structure of an item (Brown, 2009), allowing for identifying and then fixing un-functioning items. Each multiple-choice item in a test is designed to include a stem (the question or the introductory statement in the item), a correct answer, and a list of distractors. The quality of the item is determined by the quality of each of these aspects. Poor quality of an item might be the result of a poorly written stem, inaccurate selected response, or un-functioning distractors. An option/distractor is considered functioning when it is selected by 5% or more of the participants (Downing, 2006; Gajjar, Sharma, Kumar, & Rana, 2014).

Using Lertap, DE analyses were conducted for each item on KAMP, with special consideration given to items that were reported to have low IF and/or ID quality. The KAMP has a total of 37 items, each with a correct answer and multiple distractors. This

gives a total of 143 options, among which 37 options are correct answers, and 106 options are distractors. The DE analysis indicated that out of the 106 distractors, 16 are un-functioning distractors (15%), and 90 are functioning distractors (85%).

As shown in Figure 1, items were plotted based on their levels of difficulty and discrimination. The researcher noticed how that most of the items with un-functioning distractors are characterized with poor IF and/or poor ID (i.e., 1, 2, 9, 10, 11, 18, 23, and 25). However, some other items (i.e., 21, 22, 24, 26, and 39) were found to include un-functioning distractors, despite having appropriate IF and ID levels. When each of these items was reviewed, there was a distractor dominating the responses rate over the other two distractors; this indicates it was more attractive than others requiring modification. Changes were made to these distractors through revising and replacement when needed. Another aspect of the DE analysis to consider, in addition to the 5% rule, is the value of $pb(r)$ for each distractor. According to Carr (2011), distractors should have a negative $pb(r)$ to be considered functioning, as it suggests that more poor performance than high performance is attracted to the distractor. In KAMP, 14 distractors are violating this rule, indicating they were more attractive to high performers than low performers; those distractors underwent further reexamination.

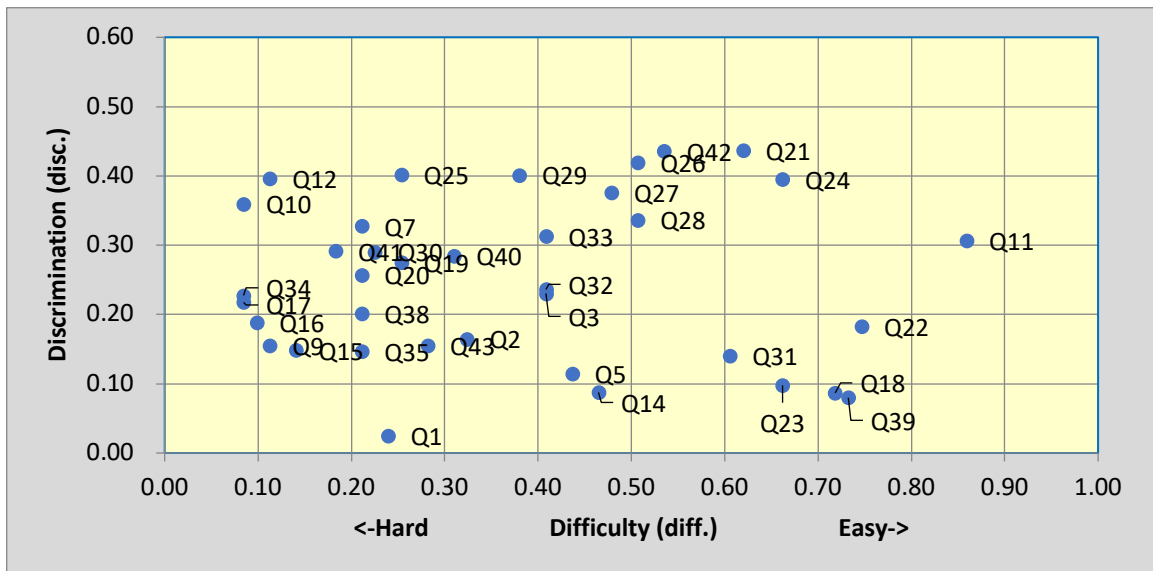


Figure 1. The Plot of KAMP's Items Based on Difficulty and Discrimination Index.

Using Table 8 and the information received from the Lertap analyses, such as the examples shown in Tables 5 and 6, each item in KAMP that was identified with low IF or/and low ID was reexamined. The internal structure of some items allowed for changes to be made to either the stem or the distractors, such as items 1, 2, 18, or 39. For example, although item-1 is characterized to be of average difficulty, it has a poor ID, and its distractor-3 is considered un-functioning. The change was made to the distractor by revising the wording of the option to enhance its transparency. Other changes made to option-4, to be “both options 1&3,” instead of “both 2&3”; more than 70% of the participants selected option-4, instead of the correct answer option-2; it is clear that it was confusing to some students to have the correct answer stated in two different options. Another example is that of item-18. This item is characterized by one un-functioning distractor, low difficulty, and poor discrimination. The options within this item are

problematic: only one participant selected distractor-1; distractor-4 was misleading to more high performers than poor performers; options 2 and 3 were both correct.

Therefore, changes were made to all the options, inserting new correct answer and three new distractors. Changes similar to these made to items 1 and 18, were also implemented to item-2 (distractor-4), item-3 (distractor-3), item-5 (distractor-3), item-7 (distractor-4), item-15 (distractor-4), item-17 (distractor-4), item-31 (distractor-3), item-39 (distractor-3), item-40 (distractor-3), and item-41 (distractor-1 and distractor-2).

Considering the fact that some items in KAMP have numeric options functioning as distractors, changes within these items were made to the stem instead of the distractors. This technique was deemed necessary when the item is prescribed with poor FI or/and ID. For example, item-34 has the word “Maktabah—Library” as the stem, where participants are asked to identify its number of morphemes, and a set of numeric options (1, 2, 3, or 4). This item is highly difficult ($FI = 0.08$), acceptable discrimination index ($DI = 0.24$), and poor distractor efficiency; in fact, option-2 has $pb(r)$ of 0.23, meaning that it is wrongly attractive to more high performance than low performance. This is expected when knowing that the word “Maktabah” can become an office “Maktab” when the “ah” is removed; it might be that the test-takers were dividing the word “Maktabah—Library” into two morphemes, “Maktab—office” and “ah.” Therefore, the change was made to the stem by replacing the word “Maktabah—Library” with the word Maktab—office. Similar changes were made to items 9, 10, 11, 21, 22, 23, 24, 25, and 26. This process of using item analysis techniques provides tremendous help to revise

the KAMP's items. The changes that were made to these items are suggested to enhance their quality, and perhaps leading to better reliability for KAMP.

Developing the Interview Protocol

The interview protocol was developed using translation and face validity techniques. However, an initial version was developed mirroring the content of Research Question 4, and feedback from the committee was used to revise and improve the protocol. Next, a certified translator, holding a Master's degree in Linguistics and TESOL, translated the protocol into Arabic. The translated copy was then piloted with one special and one general education teachers, involving the use of cognitive interviews. The generated feedback from the pilot led to minor revisions (e.g., wording, reordering of some questions), and helped the researchers to become familiar with the interviewing process (e.g., interview set up, recoding, taking notes). The final version of the interview protocol is presented in Appendix C, and it was used to collect data during the qualitative phase of the study.

Procedures

This study was composed of two data collection phases, the quantitative phase using a questionnaire and a qualitative phase using semi-structured interviews. Following the approval of the Saudi Ministry of Education, and the Internal Review Board (IRB) at the University of North Carolina at Greensboro, the researcher used the database provided by the Saudi Ministry of Education, through its Research and Innovation Sector (RIS), to spread out the survey to the targeted sample. Through their cell phones, teachers were invited to participate in the study using an embedded link that led to the survey

hosted in Qualtrics at UNCG. The questionnaire was used to collect data on teachers' knowledge of Arabic morphology and phonology, as well as to recruit participants for the interviews. Special education teachers who completed the survey were presented with a recruitment link for further contact information. The interviews were then conducted with the selected teachers at their convenience time and mean of communication. The data from the survey, as well as the interviews' audiotapes and transcripts, were stored using the UNCG Box service, following the guidelines of the UNCG IRB.

Data Analyses

The Quantitative Phase

The quantitative data were analyzed using various statistical techniques through the Statistical Package for Social Science software (SPSS.v26). The researcher utilized both descriptive and inferential analysis approaches to address the research questions. Following is a brief overview of the used approaches, including what and how each is used throughout the study.

Descriptive statistics. Descriptive statistics was used to report on the participants' characteristics and the general findings necessary to lay the groundwork for fully addressing the research questions. More specifically, the researcher used percentages, frequencies, means, and standard deviations to report on the participants' response rates, as well as to summarize the findings from the background and personal information section of the survey (BPI section), this included information about teachers' specialization, gender, highest educational degree, level of teaching experience, level of confidence teaching students with reading disabilities and perceived language knowledge.

Additionally, the means and standard deviations were used to report on the overall performance of teachers in relation to the KAMP test. Furthermore, before answering the research question, the researcher devoted a whole section, where means and standard deviations were used to summarize findings from crosstab analyses related to teachers' perception of phonology and morphology knowledge, and level of confidence teaching reading for students with RDs. Also, descriptive statistics of the mean and the standard deviation was utilized across Research Questions 1, 2, and 3, along with inferential statistics.

Inferential statistics. The inferential analysis was used to address the dissertation's research questions. This included using the student *t*-test and the Analysis of Variance (two-way-ANOVA). The *student t*-test independent sample is used to answer research questions that involve the comparison of two groups on a continuous variable. There are five assumptions for conducting a *t*-test, which includes involving one categorical independent variable and one continuous dependent variable, independency of observations across the two groups, normality of distribution, absence of outliers, and homogeneity of variance. The two-way ANOVA answers research questions that involve a continuous variable and two categorical variables. Assumptions related to the two-way ANOVA include normality of distribution, absence of outliers, and the homogeneity of variance. All these assumptions were reviewed and validated before concocting each of these analyses.

The Qualitative Phase

This phase consisted of using semi-structured interviews to collect qualitative data that address Research Question 4. The data collection and data analysis were conducted simultaneously. Qualitative data were analyzed using the thematic analysis framework (Braun & Clarke, 2006). The quality of the data collection and data analysis was ensured by addressing four fundamental criteria associated with qualitative research, including credibility, transferability, confirmability, and dependability.

Data analysis. The researcher used the thematic analysis framework suggested in Braun and Clarke (2006) as well as Braun, Clarke, Hayfield, and Terry (2019) for analyzing qualitative data. According to Braun and Clarke (2006), the thematic analysis is “a method for identifying patterns (themes) within the data” (p. 79). This framework involves a process of six steps: establishing familiarization, generating codes, constructing themes, reviewing themes, defining the names of the themes, and producing the report.

Familiarization. This step requires the researcher to establish familiarity with the data by being immersed in the data. This was achieved by transcribing the data and repeated reading of the transcriptions (Braun et al., 2019). All the audiotapes of the interviews were transcribed by the researcher, to produce a written Microsoft Word document for each of the conducted interviews; transcribing was conducted immediately after each interview. This step helped to construct a cohesive understanding of the data to an extent possible for discovering patterns. This step was difficult and time-consuming, but it was necessary for effective thematic analysis. When conducting this step, the

researcher avoided selectiveness and treated the whole data as important; doing otherwise would lead to ignoring important pieces of information (Javadi & Zarea, 2016). During each transcribing, the researcher maintained the habit of noting information about possible codes and themes, as well as personal feelings such as agreements, disagreements, concerns, interest, etc.

Generating codes. This step relied on the outcomes of the repeated reading of the data and the generated notes, as well as a list of ideas and possible quotes (Braun & Clarke, 2006). It involved generating as many codes as needed to capture the meaning of all the information in the data. At the end of this stage, the data appeared as being chunked into segments with codes (Braun et al., 2019). According to Braun et al. (2019), when there is no theory or prior concepts to be applied to guide the analysis process, it is suggested that the researcher approach the data with an inductive lens because a deductive lens is used when there is a predefined theoretical framework that guides the interpretative process. In the context of this study, the researcher used inductive coding to address each piece of the data with relevant codes, leading to the generation of more than 50 codes and 300 coded segments. Repeated reading of the transcripts and analyzing of the relevance and appropriateness of the generated codes led to a process of refining, renaming, and combining of codes, which reduced the list to 30 codes and 228 coded segments.

Constructing themes. At this stage, the researcher used the list of codes to develop an emergent set of themes that work as overreaching umbrellas for all the generated codes. Braun et al. (2019) indicated that researchers should be aware of the

different meaning associated with codes, with some codes being explicit and apparent from the surface screening of the data (i.e., semantic codes), and other codes being implicit and requiring conceptualization that uncovers their meaning (i.e., latent codes). Furthermore, some codes apply only to a specific theme, while other codes apply to more than one theme. It is therefore suggested that the researcher provides ample description for each theme and uses visual representations, mind-mapping, and tables (Braun & Clarke, 2006). The researcher used a detailed description to define each generated theme, as well as summarizing tables that organize the theme with related codes linked to their relevant quotations. This helped during the theme-construction phase, where themes are created and refined, as well as during peer debriefing for ensuring the quality of the analysis.

Reviewing themes. This step led to renaming, combining, rearranging, and deleting of some themes and codes. This process was guided by two essential concepts—Internal homogeneity and external heterogeneity (Braun & Clarke, 2006; Javadi & Zarea, 2016). *Internal homogeneity* refers to how the data within a specific theme are meaningfully related; *external heterogeneity* refers to how the themes are differentiable from one another. This technique was utilized at this stage of the analysis using concept-mapping, aided with the tables that define and describe each theme. Approaching the reviewing stage with this understanding made the process of editing the themes more effective and transparent.

Defining the names of the themes. At this step, the goal was to finalize the generated themes by providing descriptions of the scope and content of each theme, as

well as making sure that each theme's name truly reflects the essence of its content (Javadi & Zarea, 2016). The researcher developed descriptions for each of the final themes, which tell the story of the theme in terms of what it is about and how it falls within the overall story narrated by other themes (Braun & Clarke, 2006). This helped to ensure that each theme and subtheme is addressing a critical piece of the story produced by this analysis. The end product of this step included revising the names of some themes, as well as merging and excluding some subthemes.

Producing the report. This was the write up of the findings from the thematic analysis. The generated themes were reported, along with extracted examples of the participants' quotes that support the creation of each theme. The goal was to provide a synthesized analytical narrative that explains the overall story as presented within the themes and the supporting quotes. Under each theme, the reported quotes were those considered best examples in terms of truly reflecting what the theme is about and how well it falls nicely within the narrative reported by that theme.

Data quality. The importance of ensuring the quality of the qualitative study is noted for increasing the trustworthiness of the study's procedures and generated interpretations (Anney, 2015). Qualitative researchers should report on how they establish the trustworthiness of a qualitative study to erase any doubts on the reliability and validity of the study (Shenton, 2004). Guba and Lincoln (2001) indicated how the trustworthiness of a qualitative study could be ensured through reporting on four criteria, including credibility, transferability, confirmability, and dependability. The following section explains how each of these criteria was considered in this study.

Credibility. Credibility is defined as pertaining to internal validity, or the trustworthiness of the inferences generated from the analyzed data. Guba and Lincoln (2001) provided a list of possible techniques that might be used to achieve credibility, such as prolonged engagement at the site, persistent observations, peer debriefing, and member checks. This study utilized peer debriefing and member checks for ensuring credibility. Peer debriefing was completed through the engagement of three external peer reviewers who acted as quality inspectors. Two Ph.D. students and a Ph.D. candidate, who speak Arabic fluently and are knowledgeable about qualitative research methods, met with the researcher several times during the qualitative phase to evaluate the quality of the thematic analysis process through reviewing the generated codes and themes. On the other hand, the member check technique involved reaching back to each interviewee with a transcribed version of the interview, which involves a general statement summarizing the researcher's understanding of the interview. The interviewees were encouraged to express their thoughts about what they said during the interview and the researcher's interpretation of it.

Transferability. Transferability is assumed as comparable to external validity. It is achieved by providing descriptions of the participants and the interview settings, that are sufficient to allow others to judge the applicability of the generated findings to different settings. Throughout chapters three and four of this study, there is a detailed description of the participants' characteristics, recruitment process, means of data collection, and process of data analysis.

Confirmability. Confirmability is identified as an analogy for objectivity. It can be achieved through triangulation; admission of the researcher's beliefs, assumptions, and roles; use of audit trails; in-depth methodological description; and recognition of shortcomings and their potential effects (Guba & Lincoln, 2001). This study utilized two techniques that included audit trails and in-depth methodological descriptions. The researcher presented copies of the interviews, personal notes, generated tables, and concept maps during all the meetings that were conducted with the peer reviewers and the doctoral committee. Also, this dissertation includes a detailed description of the data collection and data analysis process, enough to allow for evaluating its quality as well as for replicating its steps.

Dependability. Dependability is comparable to the concept of reliability. It can be achieved through the use of external auditors (Guba & Lincoln, 2001). For this study, the dissertation committee members provided feedback and suggestions and were considered and used to improve the quality of steps and process of the qualitative phase.

An Overview of Research Questions, Data Collection, and Analysis Procedures

As shown in Table 9, this study has three quantitative research questions and one qualitative research question. The quantitative questions were addressed using descriptive and inferential statistical analysis, while the qualitative question was addressed using thematic analysis. Following is a description of each research question, along with details on the chosen type of analysis, and followed by a matrix that links research questions, data collection tools, and data analysis procedures.

Research Question 1

This research question aimed at comparing the KAMP performance of the general classroom group to that of the special classroom group. For that, the student *t*-test (a parametric test) was used since it involved comparing two groups (i.e., GETs and SETs) for their performance on a continuous variable (i.e., the KAMP). The appropriateness of the *t*-test independent-sample for this analysis was decided based on meeting the assumptions related to types of the independent and dependent variables (one categorical with two levels and one continues), the independency of observations, the normality of the distribution, the absence of the outliers, and the homogeneity of the variance.

Research Question 2

Research Question 2 aimed at examining the differences in perception of phonology and morphology knowledge between general and special education teachers. This question was answered using the student *t*-test for meeting the assumptions related to the normality of the distribution, absence of outliers, homogeneity of variance, and the presence of a categorical variable as an independent variable. The dependent variable (teachers' perception of phonology and morphology knowledge), although an ordinal variable, was treated as a continuous variable in this analysis. This particular change is acceptable and assumed to have no harmful impact on the generated results (Norman, 2010; Sullivan & Artino, 2013).

Research Question 3

Research Question 3 aimed at comparing the KAMP' performance of the GETs to that of the SETs, when accounting for teachers' level of teaching experience (i.e., little

experience, average experience, and high experience). For that, a two-way-ANOVA (2 X 3) design was used since that question three seeks to examine the influence of two categorical variables on a continuous variable. Other assumptions for the 2-way ANOVA were checked to be valid, including dependency of observations, normality of residuals distribution, absence of outliers, and homogeneity of variances.

Research Question 4

Research Question 4 is qualitative. It aimed to explain the findings generated from the survey about teacher knowledge of Arabic morphology and phonology. It purposed to seek an in-depth understanding of how teachers describe their knowledge of these basic language elements and how they perceive the importance and unique role of language knowledge in the process of reading, especially for students with reading disabilities. Also, it collected information about the instructional practices that teachers implement when addressing the reading needs of students with RDs. Teachers' responses were audiotaped and transcribed for analysis. The thematic analysis approach suggested in Braun and Clarke (2006) was utilized to analyze, organize, and report on the findings from the interviews. Also, the MAXQDA, which is a software for qualitative data, was used to organize the analysis process.

Table 9

Overview Matrix of Research Questions, Data Collection Tools, and Data Analysis Procedures

Research Questions	Variables	Data Collection	Data Analysis
1# What are the differences between special and general classroom teachers on their knowledge of Arabic morphology and phonology as assessed by the KAMP?	Performance on the KAMP (continues-DV) Certification Type (categorical-IV)	Survey – Section B: Knowledge of Arabic morphology and phonology (KAMP)	Descriptive Statistics (means, standard deviations, and percentages) and Inferential Statistics (student <i>t</i> -test)
2# What are the differences between special and general classroom teachers in terms of how they perceive their knowledge of Arabic morphology and phonology?	perceived knowledge (Interval-DV) Certification Type (categorical-IV)	Survey – Section A: Background and Personal Information (BPI)	Descriptive Statistics (means, standard deviations, and percentages) and Inferential Statistics (student <i>t</i> -test)
3# What are the differences between general and special education teachers on their knowledge of Arabic morphology and phonology, as measured by the KAMP, based on their level of teaching experience?	Performance on the KAMP (continues-DV) Certification Type (categorical-IV) Levels of Teaching Experiences (categorical-IV)	Survey – Section A: Background and Personal Information (BPI) Survey – Section B: Knowledge of Arabic morphology and phonology (KAMP)	Descriptive Statistics (means, standard deviations, and percentages) and Inferential Statistics (2-way ANOVA)
4# How do special education teachers describe the role of language knowledge in the learning of reading for their students, and do their described instructional practices reflect an appreciation of this role?		Semi-Structured Interviews	Thematic Analysis

Chapter Summary

This chapter started with a discussion of the different methodologies adopted in educational research, leading to justifying the use of a mixed methods design for this dissertation. Then, the purpose of the current study and its research questions were stated, leading to a discussion of the study population, the sampling process, and the data collection tools. Next, the chapter presented details on the validity and reliability of the study instruments. Finally, the chapter concluded by describing the study procedures and the data analysis for the quantitative and qualitative phases of the study.

CHAPTER IV

RESULTS

The purpose of this study was to examine the knowledge of basic Arabic word structures (i.e., phonology knowledge and morphology knowledge) among general and special education teachers of students with reading disabilities (RDs) from elementary schools in Saudi Arabia. The study used a combination of quantitative and qualitative research methods to answer the proposed four research questions. This chapter presents the result of this study, organized following the adopted mixed method structure. This chapter starts with the findings from the quantitative phase, followed by the findings from the qualitative phase.

The Quantitative Phase

The quantitative phase consisted of a survey composed of two parts: the background and personal information section (BPI), as well as the test for knowledge of Arabic morphology and phonology section (KAMP). At first, the demographic information of the participants in the survey is presented. Then, a preliminary analysis of the data is provided, for it is necessary to set the stage for answering the study's quantitative research questions. The preliminary analysis includes accounting for missing values and outliers, assessing the normality of the distribution, and evaluating the reliability of the instrument.

Demographic Information

The participants on the survey are teachers of students with RDs from elementary schools in Riyadh city. Chapter III included a lengthy description of the population and the criteria for inclusion in the study. Following the approval from the Saudi Ministry of Education to conduct the study, the researcher used a service provided by the ministry through its Research and Innovation Sector (RIS) to send the survey to the targeted population. The RIS has access to vast data on Saudi teachers, students, schools, educational services and programs, and special education, that is updated every year. Through RIS, the researcher was able to sample from the population of general and special education teachers, teaching in elementary schools with special education programs for students with RDs in Riyadh city.

The sampling was based on teachers' cell phone numbers stored in the Saudi Ministry of Education's system. Accordingly, 1,200 special and general classroom teachers were sampled out of a total population of more than 4,000 teachers. The survey was accessed by 445 special and general classroom teachers. This set the participation rate at 37%, which is considered acceptable in survey research. Noteworthy to say, around one-third of the respondents did not complete the survey, despite multiple encouraging texts that were sent over 3 weeks. In total, 182 teachers provided responses limited to only the items in the BPI section. This resulted in only 263 valid surveys for the statistical analyses related to this study (Table 10).

Table 10

Number of Participants and the Response Rates

	<i>n</i>	Sampled	Responded	Response Rate
Special Ed. Teachers	966	600	213	32.7%
General Ed. Teachers	3140	600	232	35.6%
<i>Total</i>	4106	1200	445	37%

Table 11 describes the participants concerning their specialization, gender, highest educational degree, level of teaching experience, level of confidence teaching students with reading disabilities, and level of perceived language knowledge.

Table 11

Demographic Information on the Participants

Variable	Categories	<i>n</i>	%
Specialization	General Education	140	53.2
	Special Education	123	46.8
Gender	Male	159	60.5
	Female	104	39.5
Highest Educational Degree	Bachelor	219	83.3
	Master	43	16.3
	Doctorate	1	0.04
Level of Teaching Experience	Little: < 5 years	16	6.1
	Average: 5 – 10 years	76	28.9
	High: > 10 years	171	65.0

Of the participants in this study, there were 53.2% general classroom teachers (GETs) and 46.8% special education teachers (SETs). Male teachers represented 60.5%

of the participants, and females represented 39.5%. The majority of the participants (83.3%) noted the bachelor's degree as their highest educational degree, 16.3% have a master's degree, and only 0.04% have a doctorate. The majority of the teachers (65%) have more than 10 years of teaching experience, 28.9% have between 5 and 10 years of teaching experience, and 6.1% have less than 5 years of teaching experience.

Preliminary Analyses

Missing data analysis. Data with missing responses are always expected in survey research. When assigned to completing a survey, some participants chose to skip items along the way, or simply withdraw before completion. For any statistical analysis to be conducted, the researcher needs to address the missing data and produce a new version that has no missing data (Bennett, 2001). The literature differentiates between three different types of missing data, which entails different ways of treatment. The missing data could be Missing Completely at Random (MCAR), Missing at Random (MAR), and Not Missing at Random (NMAR). According to Scheffer (2002), when the pattern of the missing data is MCAR or MAR, it can be ignored or accounted for using some statistical techniques (e.g., case deletion, mean substitution, multiple imputation, and Expectation-Maximization imputation). The decision of what technique to use is based on the amount and type of missing data. When the amount of the missing data is small and ignorable, it might be appropriate to use case deletion, keeping in mind that different statistical analyses require a different number of cases. However, sometimes the researcher would have to use more advanced techniques such as Expectation-Maximization imputation to produce unbiased data. In contrast to MCAR and MAR,

when the missing data is NMAR, it indicates that some participants decided not to respond to an item or items for sensitivity or confidentiality reasons; this might be apparent when the recording of the data lacks anonymity. In this case, the reasons for this missingness are unignorable and indicate that “the value of the missing data is directly related to the value of the [observed] variable” (Pigott, 2001, p. 355). This kind of missing data poses a serious threat to data analysis (Graham, 2009).

The first step in accounting for the missing data is to determine its type. In this study, missing value analysis techniques with the SPSS.v26 package 26.0 were used. The findings from the Little’s MCAR test were found to be non-significant ($\text{sig} = .148$), and the amount of the missing data was equal to 9.41%, produced by 38 participants (12.8%). The finding from the Little’s MCAR test for significance suggests that the pattern of the missing data is MCAR, meaning that, the reasons for the missing data are ignorable, and the pattern of the missing data is not systematic nor directly related to the value of the study variables. This finding allows for different actions ranging from the simple technique of deleting cases to the more advanced technique of using imputation. The researcher used the Expectation-Maximization (EM) imputation function within SPSS.v26 to generate a new data set with no missing values. The EM imputation is based on a robust regression analysis that uses values within the study variables to expect the missing values for each case (Bennett, 2001; Graham, 2009).

Outliers analysis. The outlier refers to “an observation . . . deviates markedly from other observations” (Corrales, Corrales, & Ledezma, 2018, p. 4). A dataset with outliers can lead to inaccurate interpretations (Stevens, 1984). Researchers need to detect

and address outliers in the data for sufficient analyses and reporting of the findings (Leys, Klein, Dominicy, & Ley, 2018). There are two types of outliers: univariant outliers and multivariant outliers (Corrales et al., 2018; Stevens, 1984). The first is concerned with the outliers within one variable (e.g., IQ score), while the second is concerned with outliers associated with more than one variable (e.g., IQ and GRE scores).

This dataset contains only one independent variable, namely the KAMP.

Therefore, this required analyzing the univariate of outliers. The univariate outliers are detected using different methods, including the use of boxplots and transformation. Although the boxplot is the most common, it is considered to be less robust for detecting outliers (Bellio & Coletto, 2016; Sim, Gan, & Chang, 2005). A more robust way of detecting univariate outliers is through the transformation of the data into Z scores; data points that exceed the Z score of 4.0 are considered outliers (Hair, Black, Babin, & Anderson, 2019). For this data set, the Z scores for values within KAMP were generated and checked for outliers. All the surveyed data points were found to be within the suggested limit; therefore, the data contains no univariate outliers. This conclusion was also strengthened by comparing the mean to the trimmed mean (the mean of the data with and without the lower and upper 5%), examining how drastic or slight is the difference between the two means (Pallant, 2016). The differences between the mean and the trimmed mean were very slight (0.1086).

Normal distribution analysis. It is essential to assess the distribution of the data because the normality of the distribution impacts decisions such as the type of statistical analysis a researcher can do. Normal distribution implies that the majority of the values

are concentrated in the center of the distribution, with some values falling evenly on the tails (Howell, 2012). When the majority of the data is concentrated at one tail, the distribution is considered positively or negatively skewed. In inferential statistics, the aim is to have normally distributed data, although it is not granted. When researchers receive data that are normal or skewed, it impacts the direction of the statistical analysis; for example, skewed data would be imperfect to use with parametric tests (e.g., *t*-test, ANOVA), leaving the choice for a non-parametric statistic (e.g., Mann-Whitney U test, Kruskal Wallis Test) or transformation of the data (Pallant, 2016). However, it all starts with initially examining the distribution of the data in order to make the correct choices.

There are different ways of assessing the normality of the distribution. The Kolmogorov-Smirnov test and the Shapiro-Wilk test are very common for testing normality. However, they are considered less accurate, as studies with small samples mostly pass the normality test, and studies with large samples are very likely to fail (Howell, 2012). Instead, for studies with large sample sizes, it is suggested to base the normality decision on the visual inspection of the shape of the distribution using Histogram and the Boxplot (Howell, 2012; Pallant, 2016). Also, the absolute values of the skewness and the kurtosis should be examined. For large sample studies (200 and more), the normality hypothesis is satisfied when the skewness and kurtosis values are less than 3.0 and 10.0, respectively (Hair et al., 2019; Kline, 2015).

Proceeding with these parameters, the skewness and kurtosis values for the KAMP were inspected and found to be within the suggested limit, indicating the

normality of the distribution (shown in Table 12). Furthermore, visual examination of the histogram and the boxplot for the KAMP support this conclusion.

Table 12

Descriptive Statistics on the KAMP

Scale	N	Mean	SD	Skewness	Skewness SD	Kurtosis	Kurtosis SD
KAMP	263	14.10	4.35	.409	.150	.003	.299

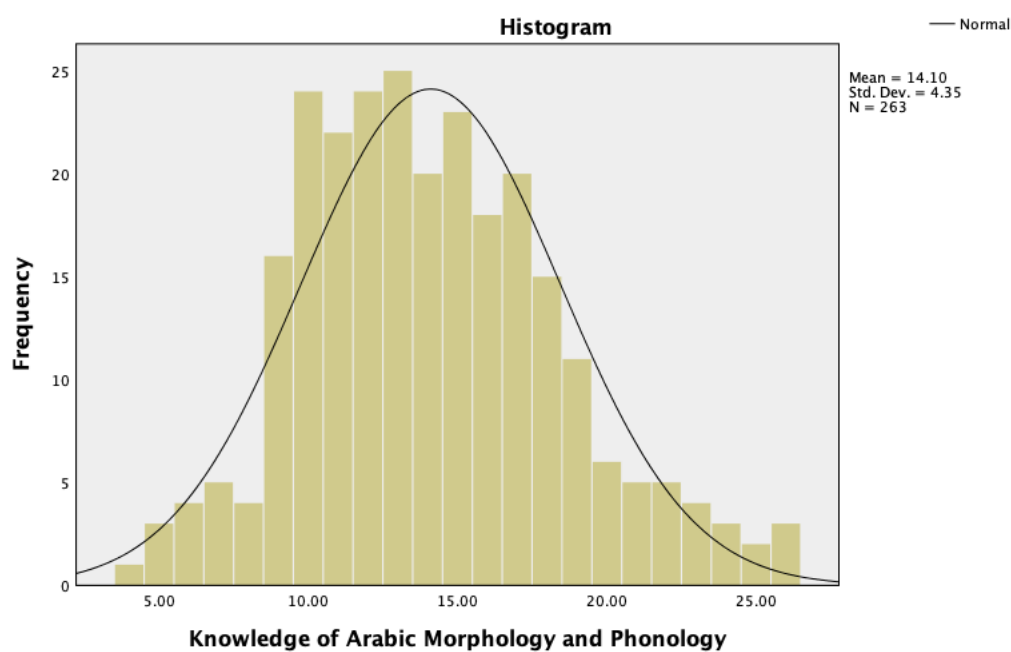


Figure 2. Histogram of the Distribution of Teachers' Performance on the KAMP Test.

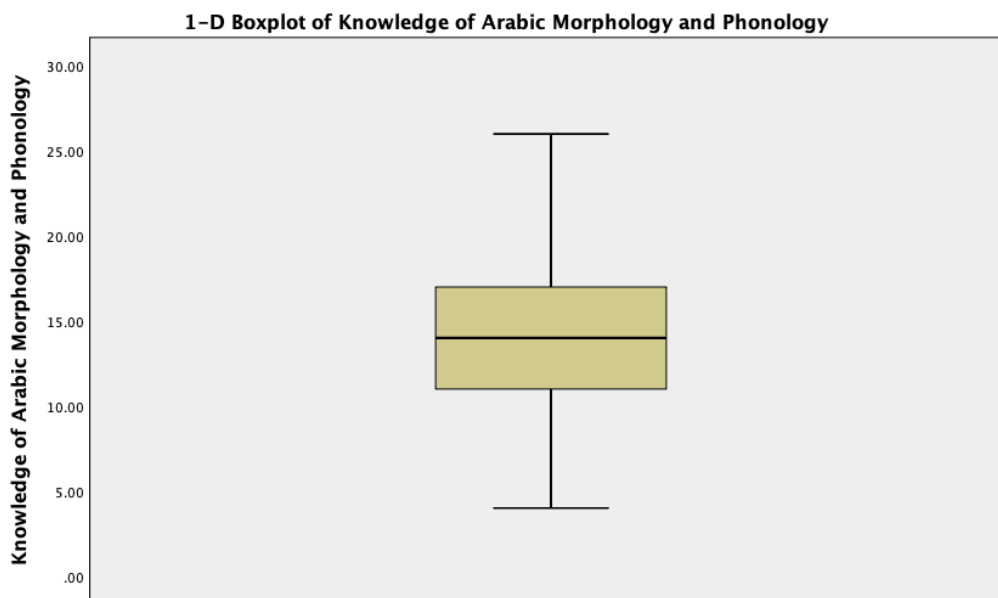


Figure 3. Boxplot on Teachers' Performance on the KAMP Test.

Reliability analysis. The reliability of the survey instruments was established in the pilot study by Fehaid, Cavanaugh, and Kamhi (2019), which was also described in detail in Chapter III. However, since the KAMP was revised based on the outcomes of the pilot study, leading to the removal of some items and reediting of others, there was a need to recalculate its reliability. Similar to the pilot study, the reliability of the survey instruments was calculated using the internal consistency coefficient (Cronbach's Alpha). Cronbach's Alpha for KAMP decreased but remained within an acceptable range. The KAMP was found to have a Cronbach's Alpha of .675. Therefore, further analysis was conducted using the point-biserial correlation $pb(r)$, which detects the correlation between each item in the scale and the final score given to each participant. Items with negative correlations were detected and removed. This resulted in removing three items

from the KAMP (i.e., i14, i19, i37), which enhanced the Cronbach's Alpha significantly to .702 (see Table 13).

Table 13

Reliability Analysis for the KAMP

Scale	<i>n</i> -item	Cronbach's Alpha
KAMP	34	$\alpha = .702$

Removing items from the KAMP required reexamination of its distribution (using histogram and boxplot), to determine the appropriate subsequent analyses. This was combined with reexamination of the mean (12.42), trimmed mean (12.28), skewness (stat = .474, std = .150) and kurtosis (stat = .063, std = .299), which all supported that the normality of the distribution is held.

Results of the Research Questions

The goal of the quantitative phase of this study was to examine participants' knowledge of Arabic morphology and phonology concerning their certification type, self-perception of knowledge, and level of teaching experience. Therefore, three research questions reflecting this purpose were addressed using the BPI and KAMP sections of the survey. However, before presenting the findings from the survey and answering these research questions, a prerequisite set of essential descriptive information related to the study, in general, is discussed. The research questions did not initially address this information, but it is necessary for better exploring the findings.

Descriptive statistics. As shown in Table 14, this study involved more general education teachers (GETs) than special education teachers (SETs). The average mean score for the GETs group was 12.09, with a standard deviation of 4.46. The SETs group achieved an averaged mean of 12.81, with a standard deviation of 4.20.

Table 14

Participants Means and Standard Deviations on the KAMP

Certification Type	<i>n</i>	<i>M</i>	<i>SD</i>
General Education Teachers	140	12.09	4.46
Special Education Teachers	123	12.81	4.20

Also, the survey included a section on teachers' background and personal information (BPI), requiring participants to self-rate their perceived phonological knowledge, morphological knowledge, and confidence in teaching students with reading disabilities using a 5-point rating scale (from high to low). Table 15 shows the participants' responses, summarized using frequency and percentages.

In terms of teachers' agreement with the statement about having a high level of confidence teaching students with RDs, responses from the GETs were 3.6% strongly disagree, 10.7% disagree, 15.7% neither agree or disagree, 57.1% agree, and 12.9% strongly agree. On the other hand, the response from the SETs were 3.3% strongly disagree, 7.3% disagree, 11.4% neither agree or disagree, 56.9% agree, and 21.1% strongly agree. For the perceived Arabic phonology knowledge, GETs self-rated as having no knowledge (4.3%), little knowledge (14.3%), average knowledge (43.6%), high knowledge (30.0%), and very high knowledge (7.9%). The SETs self-rated as

having no knowledge (3.3%), little knowledge (24.4%), average knowledge (45.5%), high knowledge (22.0%), and very high knowledge (4.9%). Finally, for the perceived Arabic morphology knowledge, GETs self-rated as having no knowledge (5%), little knowledge (16.4%), average knowledge (47.9%), high knowledge (24.0%), and very high knowledge (5.7%). The SETs self-rated as having no knowledge (10.6%), little knowledge (30.1%), average knowledge (44.7%), high knowledge (13%), and very high knowledge (1.6%).

Table 15

Participants' Self-Rating of Their Confidence Teaching Reading for Students with RDs, as Well as Knowledge of Arabic Phonology and Morphology (Summarized by Specialization)

Variable	Response	GETs		SETs	
		<i>n</i>	%	<i>n</i>	%
confidence teaching students with reading disabilities	Strongly Disagree	5	3.6	4	3.3
	Disagree	15	10.7	9	7.3
	Neither agree nor disagree	22	15.7	14	11.4
	Agree	80	57.1	70	56.9
	Strongly Agree	18	12.9	26	21.1
Perceive Knowledge of Arabic Phonology	No Knowledge	6	4.3	4	3.3
	Little Knowledge	20	14.3	30	24.4
	Average Knowledge	61	43.6	56	45.5
	High Knowledge	42	30.0	27	22.0
	Very High Knowledge	11	7.9	6	4.9
Perceive Knowledge of Arabic Morphology	No Knowledge	7	5.0	13	10.6
	Little Knowledge	23	16.4	37	30.1
	Average Knowledge	67	47.9	55	44.7
	High Knowledge	35	25.0	16	13.0
	Very High Knowledge	8	5.7	2	1.6

What these figures indicate is that the majority of GETs (70%) and SETs (78%) agreed or strongly agreed with the suggestion of having high confidence teaching reading for students with RDs. Also, only more than one-third of the GETs and one-fourth of the SETs (i.e., 37.9%, and 26.9%) perceived their phonology knowledge as high or very high. At the same time, only one-third of the GETs (30.7%) and close to one-fourth of the SETs (23.6%) perceived their morphology knowledge to be high or very high. The majority of the GETs and SETs perceived themselves to have average to no knowledge of Arabic phonology or Arabic morphology.

The final version of the KAMP that was administered to the participants had 37 items; however, the conducted analyses were based on a shortened version with 34 items, after removing item i14, i19, and i37, to improve reliability. Teachers' performance on the KAMP was poor in general, evident by the teachers' overall average ($M = 12.43$, $SD = 4.35$). As shown in Table 16, one-third of the participants (31.55 %) scored 7–10, which is comparable to correctly answering only 20% of the items in KAMP. Further, the vast majority of the participants (62.35 %) scored under 14, which is equal to answering only 30 % or less of the KAMP's items. Only two teachers achieved a maximum score of 25, which means correctly answering 73.5% of the items in KAMP. A close look at teachers' performance indicated that teachers failed concept-related items (i.e., defining phoneme, morpheme, and phonemic awareness), as well as in application-related items (e.g., identifying the number of phonemes and syllables in words and matching words based on their morphological structure).

Table 16

Participants' Performance Summarized by KAMP's Percentiles

KAMP's Percentiles	Score	Frequency	Percentage	Cumulative Frequency	Cumulative Percentage
<10	1 – 3	2	0.76	2	0.76
10	4 – 6	14	5.32	16	6.08
20	7 – 10	83	31.55	99	37.64
30	11 – 13	65	24.71	164	62.35
40	14 – 16	51	19.39	215	81.74
50	17 – 20	36	13.68	251	95.43
60	21 – 23	9	3.42	260	98.85
70	24 – 25	3	1.14	263	100.00
80	26 – 28	0	0.00		
90	28 – 30	0	0.00		
> 90	31 – 34	0	0.00		

Research Question 1: What is the difference between the special and general classroom teachers on their knowledge of Arabic morphology and phonology, as depicted by the KAMP? From the analysis provided with the descriptive statistics section, it is clear that teachers performed poorly on the KAMP. The first research question is concerned with examining the impact of certification type (teacher specialization) on teachers' knowledge of Arabic morphology and phonology, as measured by the KAMP. For that reason, the *t*-test statistical procedures for independent samples were used to analyze if there was a difference in performance on the KAMP between the group of general classroom teachers and the group of special education teachers.

The appropriateness of using the independent samples *t*-test is based on meeting some assumptions. First, the *t*-test measures the impact of one categorical independent variable on a continuous dependent variable. In this regard, the independent variable is the teacher certification type (categorical), and the dependent variable is performance on KAMP (continuous). Second, the *t*-test requires independency of observation, meaning that the groups of special education teachers and general education classroom teachers are independent groups, which is the case here since Saudi teachers can only have either a special education certification or a general education certification; thus, they were limited in the survey to select one certification type. Third, the *t*-test requires normality of distribution and absence of outliers. For that purpose, data were split into two files, according to teachers' specialization, allowing for examining the normality of the distribution and absence of the outliers for each group separately, revealing the absence of outliers and normality of the distributions. Finally, the *t*-test requires homogeneity of variance, that the population variance for each group is the same, which indicates the equivalence of the groups' sample sizes. This assumption was also validated using Levene's test for equality of variance ($p = .507$). Therefore, the independent samples *t*-test was considered appropriate for answering this research question.

After ensuring the assumptions for the independent samples *t*-test were met, SPSS.v26 was used to run a *t*-test comparing the KAMP performances of special and general education classroom teachers. The following hypotheses related to Research Question 1 guided the analysis:

$$H_0: \mu_{\text{General Classroom Teachers}} = \mu_{\text{Special Education Teachers}}$$

$$H_1: \mu_{\text{General Classroom Teachers}} \neq \mu_{\text{Special Education Teachers}}$$

Table 17

Means, Standard Deviations and the Outcome of the *t*-test on KAMP Reported by Specialization

Specialization	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	sig (2-tailed)
Special Education Teachers	123	12.81	4.20	1.341	.181
General Education Teachers	140	12.09	4.46		

As shown in Table 17, the participants were 123 special education teachers and 140 general classroom teachers. The scored mean for the special education group ($M = 12.81$, $SD = 4.20$) was higher than that for the general classroom teachers ($M = 12.09$, $SD = 4.46$). The special education teachers' mean KAMP' score was .71 ($SE = 0.53$) higher than the general classroom teachers' mean KAMP' score. However, this mean difference is not statistically significant, $t = 1.341$, $p = .181$. Therefore, we accept the null hypothesis, that there is no significant difference between SETs and GETs on their knowledge of Arabic morphology and phonology as measured by the KAMP.

Research Question 2: What is the difference between the special and general education classroom teachers in terms of how they perceive their knowledge of Arabic morphology and phonology? The participants rated their knowledge of Arabic morphology and phonology as to be close to average, $M = 2.89$ and $M = 3.13$, respectively. Research Question 2 aims at taking a further step by analyzing the differences in self-perception when accounting for the teachers' type of certification. For that purpose, the responses on the phonology questions and the responses on the

morphology question were combined for each participant, giving a single score that represents the overall perception of knowledge of Arabic morphology and phonology, or KAMP.

$$\text{Perception of KAMP} = \frac{\text{perceived phonology} + \text{perceived morphology}}{2}$$

The statistical analysis was conducted using a student independent samples *t*-test to examine differences in perception of knowledge between the groups of SETs and GETs. The assumptions for conducting a *t*-test were reviewed and validated. Accordingly, the following hypotheses guided the analysis:

$$H_0: \mu_{\text{Perceived KAMP for GET}} = \mu_{\text{Perceived KAMP for SET}}$$

$$H_1: \mu_{\text{Perceived KAMP for GET}} \neq \mu_{\text{Perceived KAMP for SET}}$$

The participants were 140 GETs ($M = 3.16$, $SD = .836$), and 123 SETs ($M = 2.82$, $SD = .804$; see Table 18). As the mean difference indicates, the GETs perceived their knowledge at a level that is higher than that indicated by the SETs. Outcomes of the *t*-test analysis indicate that a statistically significant mean difference between the two groups ($p = .001$). See Table 19.

Table 18

Means and Standard Deviation on Perceived KAMP Reported by Specialization

Specialization	<i>N</i>	<i>M</i>	<i>SD</i>
General Education Teachers	140	3.16	.836
Special Education Teachers	123	2.82	.804

Table 19

A *t*-test on Teachers' Perceived KAMP by Specialization

<i>t</i>	<i>df</i>	sig (2-tailed)	Mean Differences	Std. Error Differences	95% Confidence Interval	
					Lower	Upper
3.300	261	.001	.33502	.10152	.13511	.53493

Therefore, the decision was to reject the null hypothesis and accept the alternative hypothesis. SETs and SETs do not perceive their knowledge of Arabic morphology and phonology the same way. Although both groups perceived their knowledge to be high, the GETs rated their knowledge at a significantly higher level than that of the SETs. This mean difference has a medium effect size, *Cohen D* = 0.41. It should be noted, however, that combining the phonology and morphology responses had no impact on the reached outcomes. Subsequent analyses, using the *t*-test, on the GETs' and SETs' perceptions of phonology and the perception of morphology (separated) produced outcomes similar to that generated from the analysis on the overall perception of KAMP. There were statistically significant differences between the GETs and SETs on their perception of their morphology knowledge, $p = .000$, and approached statistically significant for differences in phonology knowledge ($P = .053$).

Research Question 3: What is the difference between the general and special education teachers on their knowledge of Arabic morphology and phonology, as measured by the KAMP, based on their level of teaching experience? Teachers' level of teaching experience was noted using three categories: teachers with little teaching

experience (less than 5 years), teachers with average teaching experience (between 5 and 10 years), and teachers with high teaching experience (more than 10 years). Using descriptive statistics, Figure 4 and Table 20 show that teachers with little teaching experience scored higher ($M = 16.75$, $SD = 4.53$) than teachers with average teaching experience ($M = 11.98$, $SD = 4.17$) and teachers with high teaching experience ($M = 12.22$, $SD = 4.21$).

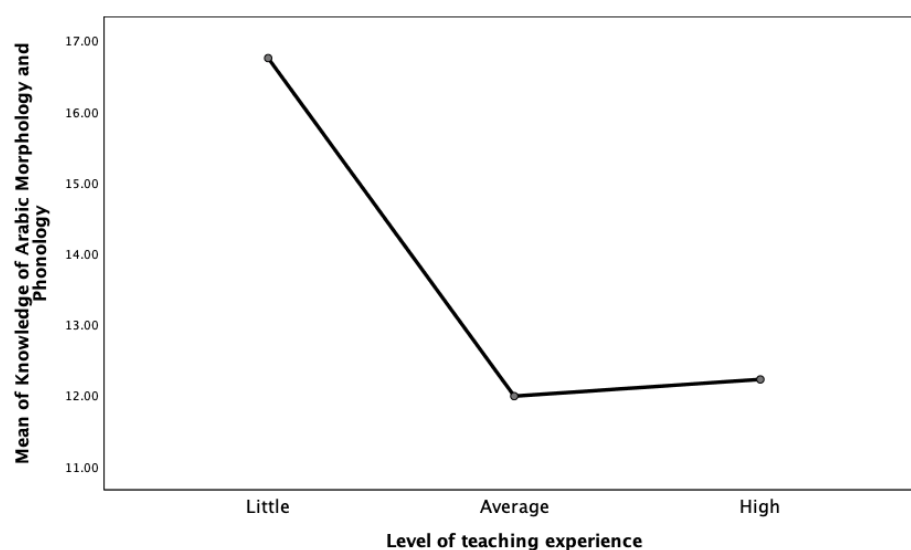


Figure 4. Plotted Means for Performance on the KAMP by Level of Teaching Experience.

Table 20

Teachers' Performance on the KAMP by Level of Teaching Experience

Teach. Ex. Level	<i>n</i>	<i>M</i>	Min	Max	<i>SD</i>
Little: < 5 years	16	16.75	8	25	4.53
Average: 5 – 10	76	11.98	5	24	4.17
High: > 10 years	171	12.22	2	25	4.21

Research Question 3 aims at measuring the impact of teachers' levels of teaching experience on their performance on the KAMP, which is at the same time shaped by their specialization. Therefore, the 2-way Analysis of Variance (2-way ANOVA) was utilized. The 2-way ANOVA is considered appropriate when the dependent variable (KAMP) is continuous and the two independent variables are categorical. The appropriateness and validity of the 2-way ANOVA for the conducted statistical analyses were also based on satisfying the following assumptions. First, when splitting data based on the levels of teaching experience and specialization, each observation was attached to its unique group, ensuring the independency of observations. Second, the data should contain no outliers; checking for outliers was performed by creating a boxplot of the residuals of the dependent variable (KAMP); these residuals were the outcomes of the interaction between the level of teaching experience (IV1) and the specialization (IV2) on the KAMP. The outcomes of this analysis indicated that four cases were outliers (two cases from the general educators with the high teaching experience group, one case from the general educators with average teaching experience group, and one case from the special educators with the high teaching experience group). Hair et al. (2019) suggested two ways for dealing with outliers when conducting multivariate analysis; one solution would be to leave the outliers, which although increases the generalizability, might threaten the analysis. Another way would be to remove the outliers; although it might decrease the generalizability, it would improve the analysis. In this case, the researcher decided to remove the outliers for two reasons (this action was limited to the analysis related to Research Question 3 only). First, it did not lead to significant changes on the groups'

means (general education-high experience: $M = 11.86$, $SD = 4.18$; general education-average: $M = 11.16$, $SD = 3.81$; and special education-high experience: $M = 12.42$, $SD = 3.98$). Second, removing these outliers improved the normal distribution of the KAMP's residuals (Kolmogorov-Smirnov: $p = .078$; and the Shapiro-Wilk: $p = .227$), as well as Levene's test for equality of variance ($p = .968$); both are assumptions necessary for the conducting the 2-way ANOVA. The final step was to run the 2-way ANOVA and report the findings. Table 21 includes the descriptive information upon which this analysis is based.

Table 21

Descriptive Statistics Related to Performance on KAMP by Specialization and Level of Teaching Experience

Teach. Ex. Level	Certification	<i>n</i>	<i>M</i>	<i>SD</i>
Little: < 5 years	General Education Teachers	9	17.22	4.99
	Special Education Teachers	7	16.14	4.18
	Total	16	16.75	4.53
Average: 5 – 10	General Education Teachers	43	11.16	3.81
	Special Education Teachers	32	12.71	4.04
	Total	75	11.82	3.96
High: > 10 years	General Education Teachers	85	11.62	3.91
	Special Education Teachers	83	12.42	3.98
	Total	168	12.01	3.96

After ensuring that assumptions for planned statistical analysis are valid, a 2 X 3 ANOVA design was utilized and run using SPSS.v26 to explore the impact of teachers' type of certification and level of teaching experience on their knowledge of Arabic morphology and phonology, as measured by the KAMP (see Table 22). Findings

indicated that the main effect for level of teaching experience statistically significant, $F(2, 253) = 10.235$, $p = .000$, and had a medium effect size (Cohen's $f^2 = .081$).

Table 22

Outcomes of 2 X 3 ANOVA on Performance on KAMP by Specialization and Level of Teaching Experience

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	422.246 ^a	5	84.449	5.322	.000	.095
Intercept	19887.517	1	19887.517	1253.206	.000	.832
Specialization	4.890	1	4.890	.308	.579	.001
Level of Teaching Experience	324.840	2	162.420	10.235	.000	.075
Specialization x Level of Teaching Experience	23.756	2	11.878	.749	.474	.006
Error	4014.936	253	15.869			
Total	43334.000	259				
Corrected Total	4437.181	258				

Note. a. $R Squared = .095$ (Adjusted $R Squared = .077$)

On the other hand, the main effect for specialization did not reach statistical significance, $F(1, 253) = .308$, $p = .579$. Furthermore, the interaction effect between specialization and level of teaching experience was not statistically significant, $F(2, 253) = .749$, $p = .474$. Therefore, a post-hoc comparison, using Tukey HSD, was limited to only the level of teaching experience, see Table 23. The post-hoc analyses indicated that only the mean score for the group with little teaching experience ($M = 16.75$, $SD = 4.53$) was significantly different from that of the average teaching experience group ($M =$

11.82, $SD = 3.96$, $p = .000$), and the high teaching experience group ($M = 12.01$, $SD = 3.96$, $p = .000$). The mean difference between the group with average teaching experience and the group with high teaching experience was not statistically significant ($p = .936$). This finding indicates that more teaching years did not lead to significantly better language knowledge.

Table 23

Post Hoc Test: Tukey HSD on Performance on the KAMP by Level of Teaching Experience

(I) Level of teaching experience	(J) Level of teaching experience	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Little	Average	4.9233*	1.09701	.000	2.3370	7.5096
	High	4.7321*	1.04225	.000	2.2749	7.1894
Average	Little	-4.9233*	1.09701	.000	-7.5096	-2.3370
	High	-.1912	.55322	.936	-1.4955	1.1131
High	Little	-4.7321*	1.04225	.000	-7.1894	-2.2749
	Average	.1912	.55322	.936	-1.1131	1.4955

Note. * The mean difference is significant at the .05 level.

Conclusion of the Quantitative Phase

This section focused on reporting the quantitative findings from the survey that addressed the knowledge of Arabic morphology and phonology among early elementary general and special education teachers of students with RDs. The findings summarized the performance of 263 teachers from the capital city of Saudi Arabia, Riyadh. Various statistical approaches used to report the findings, including descriptive statistics, student

t-test, and two-way-ANOVA. Results indicated that teachers seemed to lack basic language knowledge of Arabic, as they performed poorly on the KAMP, failing to define essential language concepts, count phonemes syllables, and morphemes in words, all of which are essential for the delivery of effective reading instruction. At the same time, teachers were found to have high perceived language knowledge, despite their poor performance at the KAMP, and GETs perceived their language knowledge at a level that is significantly higher than that of the SETs. Finally, teachers' years of teaching experience was found to have no impact on their language knowledge; in fact, teachers with little teaching experience performed significantly higher than teachers with average or high teaching experience.

The Qualitative Phase

The purpose of the qualitative phase was to yield information that would help to expand an understanding of the results generated from the quantitative phase. Therefore, the researcher utilized follow-up semi-structured interviews to collect more information from the special education teachers who participated in the quantitative phase around how they describe the role of language knowledge in the learning of reading for their students, especially students with reading disabilities, and what instructional practices they devise to address the reading needs of those students. Appendix C shows the interview guiding protocol for these interviews. The next section will introduce background information on the participants, followed by a detailed presentation of the findings generated from the conducted thematic analysis of the interviews.

Demographic Information

Participants of the semi-structured interviews were special education teachers of students with learning disabilities who completed the first phase of this study (the survey) and were willing to be interviewed. Following the completion of the study survey, special education teachers were encouraged to sign up for the follow-up interviews. Teachers willing to participate had to provide contact information, choose the preferable means for the interview, and set a convenient date and time for the interview. A total of 25 special education teachers gave their consent and provided their communications. Those teachers were then grouped into two distinctive groups based on their Arabic language knowledge, teachers with a KAMP score above the 50th percentile and teachers with a KAMP score below the 50th percentile (see pages 83-84 for more details). Selection from the two groups continued until reaching redundancy, or when there was no new information coming from the conducting of more interviews; this gave a total of eight interviews included in this study.

Furthermore, one teacher refused to allow for audio-recording of the interview and preferred to use WhatsApp instead. However, his written responses were not rich enough to be considered for thematic analysis, as he responded to the main questions with only a few words and ignored most of the follow-up questions. Therefore, the interviews from eight special education teachers were included in thematic analysis. Table 24 provides a detailed summary of the participants, including gender, teaching experience, qualification, perceived confidence in teaching reading to students with reading

disabilities, perceived phonology knowledge, perceived morphology knowledge, and performance on the KAMP.

Table 24

Demographic Information of the Participants in the Interviews

Participant	Gender	Teaching Experience	Qualification	Confidence Teaching Reading	Perceived Phonology	Perceived Morphology	KAMP Score
Mona	Female	5	Master	High	Average	Average	25
Hind	Female	11	Bachelor	High	Little	Little	8
Norah	Female	13	Master	High	Little	No Knowledge	10
Saleh	Male	20	Bachelor	High	Average	Average	11
Fahad	Male	13	Master	Very High	High	Average	20
Salman	Male	10	Master	High	Little	No Knowledge	18
Waleed	Male	13	Bachelor	High	Average	Average	18
Theeb	Male	12	Master	High	Little	No Knowledge	8

Participants were three females and five males; all are special education teachers for students with learning disabilities. Two of the female teachers and three of the male teachers have a master's degree in special education, while one female teacher and two male teachers have only a bachelor's degree. All the participants were teaching in resource rooms and used pull-outs to serve their students. The number of years of teaching experience ranged between 5 and 20 years, which gives an average of 12 years of teaching experience. Of the participants, seven teachers indicated having high confidence in teaching reading to students with reading disabilities, and one teacher indicated having very high confidence. Also, two teachers perceived their phonology

knowledge to be high, three teachers perceived it to be average, and three teachers perceived it to be little.

On the other hand, only one teacher perceived his morphology knowledge as high, while four teachers perceived their knowledge as average, one teacher perceived her knowledge as little, and two teachers indicated that they had no knowledge of word morphology. In terms of teachers' performance on the KAMP, teachers' scores ranged between 8 and 25, which results in an average of 15.6. Six of the interviewed teachers achieved KAMP scores that were above the overall mean, and two teachers achieved scores below the overall mean (the overall mean for the special education teachers was 12.81).

Data Analysis and Data Quality

The qualitative phase of this study was based on one research question regarding what special education teachers understand about the concept of Arabic language knowledge, its role in the development of reading in general and for students with reading disabilities, and how it is represented in their daily reading instruction. Therefore, using a set of semi-structured interviews with a sample of eight teachers allowed for the freedom to ask more questions yielding more information that helped to give a complete picture of what teachers know about language, reading development, reading disabilities, and how they teach reading.

All the interviews were transcribed by the researcher, producing eight different Microsoft Word documents that were imported to the MAXQDA for analysis. The analysis was conducted using a thematic analysis approach (Braun & Clarke, 2006;

Braun et al., 2019). This approach consisted of six steps, which were described in detail in Chapter III. The MAXQDA is a qualitative analytical software that helped with thematic analysis by allowing for initiating, storing, modifying, and organizing of the codes and themes.

A code is “a short word or phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data” (Saldana, 2015, p. 4). The initial coding process resulted in generating more than 49 different codes, which were then reduced through the process of thematic analysis and peer debriefing into 21 distinctive codes that were further analyzed and grouped into different themes and subthemes. A theme is a label that indicates a meaning or an important pattern that exists within the collected segments of the qualitative data (Javadi & Zarea, 2016). The final list of codes was organized into five major themes: familiarity with concepts related to Arabic language elements; knowledge of concepts related to Arabic language elements; reading, reading disabilities, and language knowledge; reading instruction for students with reading disabilities; and needed legislative, administrative, and instructional support. Table 25 shows the themes, along with descriptive information related to appearances and frequency of use for each theme across the eight interviews.

Table 25

Themes, Coverage and Quantity of Coded Segments

Themes	Coverage	Frequency
Familiarity with Concepts of Basic Arabic Language Knowledge Elements	100%	21
Knowledge of Concepts of Basic Arabic Language Knowledge Elements	100%	11
Reading, Reading Disabilities, and Language Knowledge	100%	32
Reading Instructions for Students with Reading Disabilities	100%	22
Needed Legislative, Administrative, and Instructional Support	100%	59
Documents with code(s)	8/8	—
Total Coded Segments	—	145

Results of Research Question 4

Research Question 4 focused on how special education teachers understand the role of the knowledge of basic Arabic language elements in the student development of reading. The question also seeks to understand how this knowledge informs teachers' reading instruction. The findings related to this research question were analyzed using thematic analysis and are presented according to the generated themes. However, it should be noted that while Themes 1-3 address the first part of Research Question 4, Theme 4 addresses the second part of the question; also, Theme 5 is presented as an independent topic. Theme 5 serves two goals: first, it provides some explanation for some of the findings generated from the survey and those presented within Themes 1–4; and second, some of the aspects presented within this theme indicate areas of need that require further exploration. Research Question 4, which guided the qualitative phase, is restated as follows:

How do special education teachers describe the role of language knowledge in the learning of reading for their students, and how do their described instructional practices reflect an appreciation of this role?

Theme 1: Familiarity with concepts related to Arabic language elements.

This theme presents how the participants describe their familiarity with and knowledge of concepts related to the Arabic language phonology, morphology, semantics, syntax, and pragmatics. Teachers' responses indicated that they are more familiar with phonology-related concepts, either through their teaching or graduate studies, than other aspects of language knowledge. Accordingly, five teachers (62.5%) stated having only some phonology knowledge; only one teacher (12.5%) indicated having some knowledge of both phonology and morphology, and two teachers (25%) indicated having no knowledge of any of the five components of Arabic language knowledge. Teachers did not use the term phonology more often; instead, they use some phonology-related terminologies such as phonemic awareness, syllabic knowledge, phonemes, sounds, and grapheme-morpheme knowledge. It should be noted, however, that familiarity with language knowledge is different than the accuracy of language knowledge, examples of which will be presented in Theme 2. For now, following are some examples from teachers' responses that show how familiar they are with the concepts related to the components of Arabic language knowledge.

Fahad, who has a master's degree and 13 years of teaching experience, indicated having familiarity with Arabic phonology and morphology. He stated, "I came to know about the concepts of language knowledge during my master's degree . . . [I was]

enrolled in a course about reading, and some lectures addressed topics such as syllables and morphemic units.” However, as it would be noted later, Fahad’s responses did not indicate familiarity or knowledge of morphology. The details he provided regarding how he defines language knowledge or how he teaches reading for students with reading disabilities were more relevant to only knowledge of phonology. Waleed’s responses suggest a similar conclusion. Waleed, who also has 13 years of teaching experience, did not prescribe his familiarity with a specific language knowledge component; he preferred using the general term “language knowledge” instead. As he pointed out that “[his] knowledge of terminologies related to language knowledge came from [his] reading of some books when [he] was studying for [his] bachelor’s degree.” I asked Waleed to share with me some of the terminologies he was referring to; Waleed replied, “you know, I mean language, like the letters and sounds . . . like when we read a word, we use the letters in the word.” These two responses might indicate a lack of knowledge to differentiate between the distinctive aspects of language knowledge.

Other teachers were explicit on limiting their knowledge to only Arabic phonology. Salman indicated that “[he] might be familiar with phonology, but certainly [he had] no knowledge of Arabic morphology.” Also, Norah, who has a master’s degree and 13 years of teaching experience, stated, “I know phonology . . . but for morphology, it is mysterious.” Similarly, Mona, who has a master’s degree and 5 years of teaching experience, stated, “the only thing that I am familiar with is syllables . . . but for the morphology, I am not.” Mona continued explaining, “I am familiar with syllables because I use it when I teach reading.” Mona’s lack of familiarity with the morphology

made her hesitant to participate in this study. As Mona puts it, “I felt that I was guessing when I was performing the test; I mean when I reached the section where I was to count the morphemic unites in words, I understood it is about words roots and additions.”

Saleh had a unique experience that separated him from the rest of the group. Saleh has a bachelor’s degree and 20 years of teaching experience. He had the chance to work with a group of speech-language pathologists, who introduced him to some terminologies and concepts related to language knowledge. Saleh stated, “I have a good phonology knowledge . . . [which I gained] from working with [speech-language] pathologists, I came to work with them through during my work with a private special education center.” In fact, during the questions about how he defines language knowledge, reading, and reading disabilities, as well as the teaching of reading, Saleh’s responses contained evidence which suggests that he is familiar with Arabic phonology.

On the other hand, Hind and Theeb were clear about their lack of familiarity with any of the language knowledge components. Hind pointed out, “I only read about phonology and morphology during the survey . . . [this is why] I feel that my information about it is very [weak] and insufficient.” Theeb, who has a master’s degree and 12 years of teaching experience, indicates a lack of familiarity with language knowledge. When I asked Theeb to describe if he is familiar with the concepts related to the Arabic language knowledge, he replied with a question: “Could you please explain to me what does language knowledge mean?” I directed him back to the survey, saying, “What about the survey you have completed, do you think it addressed any aspects of language

knowledge?” Theeb then said, “Well, from the survey, I might be familiar with syllables because I use it in my teaching.”

In summary, these quotations indicated how the majority of the interviewed special education teachers are only *familiar* with concepts of Arabic phonology. At the same time, most teachers indicated a lack of familiarity with Arabic morphology. Other aspects of the Arabic language (e.g., syntax, semantics, and pragmatics) were not mentioned at all. Although most of the items in the KAMP target the application of language knowledge (only 8% was about knowledge of terminologies), the two cannot be separated. If teachers lack the knowledge about the basic concepts that differentiate between phonemes and morphemes, they might struggle to perform related tasks and rely instead on their experience. Finally, the observations regarding teachers’ unfamiliarity with concepts of Arabic language should be taken into consideration to explain (not to justify) the witnessed poor performance in the KAMP among the special education teachers.

Theme 2: Knowledge of concepts related to Arabic language elements. This theme is concerned with how the interviewees define Arabic language knowledge. Teachers differed in their knowledge; some teachers seemed to have more knowledge than others. However, it seems that teachers’ familiarity with the phonology aspect of the Arabic language influenced how they defined language knowledge; most teachers used terminologies such as the Arabic alphabetic, grapheme-phoneme relationship, phonemic awareness, syllabic knowledge, and short and long vowels. The definitions provided by the teachers were either very generic or sometimes incorrect. Furthermore, no teacher

was able to provide a description that included all five components of Arabic language knowledge—phonology, morphology, syntax, semantics, and pragmatics.

Knowledge of phonology was dominating the definitions provided by teachers, despite indicating that it is how they define language knowledge. For example, Hind noted, “language knowledge is related to analyzing the word into its syllables . . . it is not only knowing the letters’ names, but also knowing how to segment the word into syllables of short and long vowels.” Similarly, Saleh defined language knowledge as “related to the letters and their sounds, and the syllables, [and] phonemic awareness means the diacritics and long vowels [this is why] kids need to be sensitive not only to the sounds in the words, but also to where a word begins and ends.” Aside from Hind and Saleh, who were more articulate in their definitions, other teachers gave definitions that were brief and nonspecific. Fahad describes language knowledge as “knowledge of the letters and syllables.” For Salman, “language knowledge . . . is the letter, its name, its sound, and the diacritics [or short vowels] used with it.” Theeb defined language knowledge to be only about syllables, and when asked to define his understanding of syllables, he indicated that “it is knowledge of sounds in the word.” Waleed describes the language knowledge as “it is about language”; when asked to elaborate, he added that language knowledge is concerned with “letters and sounds, and how to segment words into their sounds.”

Other teachers were more explicit about admitting the lack of comprehensiveness on their definitions of language knowledge. For example, Norah described language knowledge as “knowledge of phonology.” She also said, “I feel I know about phonology

. . . I know from your survey that morphology has a role, and I think also that syntax too . . . but I do not feel I know a lot about them.” As for phonology, Norah thinks that it is about “the words’ sounds . . . if you do not say the word [correctly], no one can understand what you say.” Similarly, Mona defined language knowledge as related to “syllables.” Mona continued saying, “syllables are important . . . I teach my students to read word using syllables . . . other things like morphology might be important too, but I am not sure, I mean, I cannot explain it.” Noteworthy, despite providing limited definitions, which indicate limited language knowledge, these two teachers were aware of the fact that language knowledge constitutes more elements besides knowledge of phonology.

Additionally, teachers were not precise on their use of some language-related terminologies. For example, because Theeb indicated that language knowledge is about syllabic knowledge, I asked him to give an example of a word and tell me its syllables; Theeb pointed out that the word “فَارِسٌ = faa:ris = knight” has three syllables, which are “faa,” “ri,” and the consonant “s.” Similarly, Fahad suggested that the word “ = كِتَابٌ kitaa:b = book” has three syllables, namely are “ki,” “taa:,” and the consonant “b.” Also, Saleh suggested the word “حَبْرٌ = hibr = ink” has three syllables, “hi,” “b,” and “r.” Furthermore, although Salman made no mention of the “syllable knowledge” when defining his understanding of language knowledge, he correctly pointed out that the word “عَالِمٌ = ʕaa:lim = scientist” should be “broken into two parts when teaching the student how to read it”; and when asked to show how he would do that, Salman indicated that “ʕaa:lim” is broken into “ʕaa:” and “lim” (see Table 26).

Table 26

Teachers Sharing Examples to Show Their Understanding of the Concepts of Syllables

Word	Suggested number of syllables	Correct number of syllables
فارس = faa:ris = knight	Three (CVV, CV, and C)	Two (CVV, and CVC)
كتاب = kitaa:b = book	Three (CVV, CV, and C)	Two (CV, and CVVC)
حبر = hibr = ink	Three (CV, C, C)	One (CVCC)
عالِم = ʕaa:lim = scientist	Two (CVV, and CVC)	Two (CVV, and CVC)

It is worrisome that teachers have a limited as well as an inaccurate understanding of concepts related to language knowledge. Teachers focused their definitions of the knowledge of phonology, ignoring other important language aspects such as morphology, semantic, and syntax. Also, their conceptualization of some phonology terminologies such as phonemes and syllables is sometimes inaccurate. Two indications can be made here. First, teachers focused only on phonology and ignored other language aspects, indicating that they have limited language knowledge, as well as little appreciation for the importance of morphology, semantic, and syntax. When learning to read, children need to develop the necessary phonology knowledge (e.g., alphabetic knowledge, phonemic awareness), morphological awareness, fundamental syntactic structures, and vocabulary. Lack of proper instruction that targets these areas might lead to severe consequences. The best way to ensure that this need is served is for teachers to possess knowledge and appreciation of these language elements.

Theme 3: Reading, reading disabilities, and language knowledge. This theme reflects how teachers understand reading and reading disabilities, as well as the role of

language knowledge. Teachers tended to define reading as a process of decoding words, and although some teachers cited the role of language knowledge, they did not explicitly describe it. Concurrently, the majority of teachers did not mention reading comprehension. For reading disabilities, teachers limited reading challenges to word-level reading, citing how students struggle to segment and blend word sounds. Noteworthy, teachers seemed to have a narrow view of the role of language knowledge in the process of reading that only highlights the role of phonology. Other aspects of language knowledge were not mentioned.

Teachers' view of reading is only limited to the process of decoding words. As Theeb described it, "reading is about constructing words from letters, and passages from words"; therefore, Theeb thinks that "when the student is taught the letters and how to read words, they will be able to read paragraphs and whole passages." Likewise, Waleed suggested that "[when defining reading], we should think about what is fundamental . . . how students analyze the word so they can read it, does the student learn how to recognize sounds . . . the focus is to teach reading letters and their sounds." Fahad also understands reading as "the process of segmenting words into syllables [and] into their sounds." Similarly, Saleh, who has the highest teaching experiences among the group, indicated that "reading . . . is about decoding words, this is my modest understanding of it, it is about analyzing the sounds in the word, the student must be aware [of] what letters is the word made of." Additionally, Hind also limited reading to the process of decoding words, "[reading is about] constructing words from sounds . . . combining syllables and combining letters together."

Although teachers were explicit on using terminologies such as sounds, syllables, alphabetic, segmenting, blending, however, not all of them were explicit on their appreciation of the role of language knowledge on reading. Hind was the only teacher who was eager to explain her view of the role of language in reading:

language is about symbols . . . if we talk about Arabic per se, and compare it to Chinese or Japanese, where the language is about drawings that convey meaning, like representing the house with a drawing that [reflects] its meaning . . . in Arabic it is more about sounds, and how the student can make different sounds for different symbols, this is why the problem for the students with learning disabilities when reading is about decoding words or blending letters into meaningful words.

Furthermore, it seems that the way teachers understand and define reading is also shaping the way they understand and define reading disabilities. Students with reading disabilities show various types of reading profiles; however, most of the participants limited their defining to reading disabilities to that of inability to decoding words (i.e., dyslexia). For example, Theeb defined reading disability to be “about knowledge of alphabetic letters . . . students must know letters in isolation and with long and short vowels for them to be good readers.” Waleed believes that “students with learning disabilities . . . cannot segment a word into its sounds, cannot read words accurately, sometimes they might read words backward or substitute letters in words.” For Mona, “students with reading disabilities have problems with recognizing letters and their sounds . . . therefore, when [she] teach[es] letters, [she] always start[s] with teaching the sounds, not the name of letters.” As for Salman, reading disabilities means having “problems with the alphabetic letters . . . writing letters backward . . . not knowing the

names and sounds of some letters, or maybe sometimes knowing the letter and its sound but failing to write it correctly.” Only Norah and Hind indicated that reading disabilities mean problems with the decoding of words, as well as with the understanding. Hind described reading disabilities as an “inability to recognize letters and identify sounds in words . . . [and that] . . . some students may have more profound reading problems like problems with fluency or even understanding.”

On the other hand, Norah indicated,

reading disabilities makes it hard for kids to recognize letters and sounds, makes it hard to blend sounds and form a word . . . off course they make many mistakes like substitution of words and slow reading . . . actually, slow reading makes it hard for them to understand what they read . . . student[s] spent more time decoding words and when you ask them about what they read, you found out that they do not understand it.

Finally, it was very interesting how teachers interpret the reasons for reading disabilities, or why some kids have problems with reading compared to others. More teachers attributed reading disabilities to external factors such as poverty, quality of reading instruction, classroom conditions, or student laziness. Some teachers attributed reading disabilities to some internal factors such as vision problems or information processing. For example, Fahad assumed that “reading disabilities might be the result of not working hard enough . . . also general classroom teacher, [he] think[s] that they are not doing enough for their students.” Likewise, Theeb indicated that the reasons for reading disabilities “are a lot, but mostly school is the main reason . . . sometimes students are taught reading by teachers with little to no experience . . . also students are placed in crowded classrooms . . . also, their families are not involved.” Mona attributed reading

disabilities to be partially related to poverty. According to Mona, “[she] taught in different schools and it is always that [her] students come from poor families, [suggesting that] it could be that because they are poor and illiterate, they do not focus on the education of their kids.”

On the other hand, Mona also thinks that reading disabilities result from problems in students’ vision, since “students are reading from print books and digital books, which leads to problems in their vision and make it hard for them to learn.” Similarly, Salman attributed reading disabilities to be a result of “vision problems” and disorders in the “attention and visual perception areas in the brain.” According to Salman, “when a student with [a] reading disability is given a sentence to read, they have a visual processing problem that [limits] their ability to process the sentence; so, when you ask the student to sound out words individually, they cannot do it.” Therefore, Salman suggested that “students must be provided special lenses to correct their vision problems so they can see letters clearly . . . when a student read words, they always focus only on the first letter of the word and cannot see the rest.” Finally, only Norah thinks that “the main reason [for reading disabilities] is a problem in the brain.” I asked Norah to elaborate, and she indicated that “[she did] not know exactly what it is, but it is about the way those kids process information, it is different than normal kids . . . they need more time.”

It is clear from all these exemplary quotations how this group of special education teachers, who have different levels of experience, have ambiguous and limited views about reading and reading disabilities. The view that reading is about acquiring the ability

to decode words is a common view among these teachers. It seems that they believe that students only need to have the ability to decipher the code to be successful readers. More troubling is their suggestion that for students to learn how to decode words, they only need to acquire phonemic awareness. This is an indication of how they neglect the important roles of morphological awareness, syntactic knowledge, and word meaning, all of which are important for successful reading experiences. Furthermore, these teachers have an inaccurate perception of the nature and severity of reading disabilities. Similar to how they view reading, these teachers believe that reading disabilities are related to the inability to decode words. It is true that dyslexia is the most common type of reading disability, but other types of reading disabilities (i.e., hyperlexia, and garden variety) are well-documented. Also, failing to understand the neurological and language basis of reading disabilities, and falsely attributing this disability to vision problems or improper instruction is worrisome. It is true that external factors may contribute to the severity of the reading disability, especially during the early grades, but there is no cause-and-effect relationship. Reading disabilities are mainly caused by deficits in the phonological and nonphonological components of language. However, it should be noted that these incorrect views of reading disability are not unique to only Saudi special education teachers, as similar views have been documented among other teachers (e.g., Hudson et al., 2007; Wadlington & Wadlington, 2005).

Theme 4: Reading instruction for students with reading disabilities. This theme reports on how teachers teach students with reading disabilities. Teachers described ways of teaching reading show consistency with how they conceptualize

reading, reading disabilities, and the role of language knowledge. Teachers continued to highlight phonology knowledge and decoding of words as the focus of their teaching. The exemplary quotations reported here shed light on two important issues—what aspects of language knowledge is present in teachers’ reading instruction, and the focus of these instructions.

Teachers indicated that only phonology, that they feel is present in their reading instruction. For example, Salman does not consider morphology in his teaching of reading, as he only focusses on “teaching students how to recognize letters and their sounds, and how to read using segmenting and blending.” Similarly, Mona noted, “the only thing from what I went through in your survey, that I really use in my teaching of reading, is teaching students how to read words using syllables.” Theeb explicitly indicated the absence of morphology in his reading instruction, as he noted, “I teach students the sounds of letters and how to read words; I might sometimes teach words meaning . . . but I do not consider morphology or syntax at all . . . I think they are important, but I do not teach them.” Furthermore, Norah noted, “I know phonology, and it is only because I learned how to teach kids to read using the *Noranian* method [which is about constructing nonsense-words using letters and sound] . . . but for morphology, it is mysterious.” This not surprising considering how those teachers described their familiarity with language knowledge, as they denied any knowledge about all aspects of language knowledge but phonology. This is the true unfolding for the “Peter Effect” principle, which suggests that we cannot teach what we do not understand (Applegate & Applegate, 2004; Applegate et al., 2014).

In terms of what they teach, teachers' sole instructional focus is decoding. Teachers indicated that they teach reading of letter sounds and gradually move to teach reading words and sentences. When teaching reading for students with reading disabilities, Saleh's instruction focus on "teaching letters' sounds, how to recognize the first and the last sounds of the words, [as] it makes it easy when teaching students how to read words . . . then teaching short vowels and long vowels." Waleed noted that he "teach[es] reading of letters first, then teach[es] reading words by segmenting sounds of words and blending them together again . . . [he] start[es] with words of two letters, three letters, four letters, and so on until six letters." Similarly, Norah starts with teaching "students [to] acquire knowledge of letters and sounds before teaching the reading of words . . . reading words of two letters, three letters, four letters, and so forth"; she added that, "after mastering reading of words I move to reading sentences composed of two words, three words, four words, and then five words . . . after that I move reading whole passages . . . this is my way and I think it is the way of most of the teachers I know." Likewise, Fahad indicated that he focuses his teaching on "reading words and letters . . . students learn how to segment words into sounds." Therefore, Fahad uses the reading materials assigned to the students in the general classroom to pick the words that he would teach, by "go[ing] two or three grades levels lower than the student's current grade . . . to make sure the words are at the student reading level." For a similar reason, Hind "choose[s] the words that [she] teach[s] from the reading books assigned to students to read in their classrooms." Teaching reading for Hind "is about sounds . . . [she] teach[es] them how to recognize sounds and stick them together to make words . . . [her] teaching

is about segmenting and blending sounds in words.” This is why Hind distinguishes her students by “those who can recognize letters and those who cannot, those who can decode words and those who cannot.” Other teachers express this pattern of focusing only on word decoding: Salman indicated, “I teach to my students letters’ names and pronunciations”; Mona focuses on “teach[ing] students to read words using syllables,” although she could not explain the concept of syllables; and for Theeb, he focuses on teaching “sounds of letters.”

It is obvious from these examples how the sole focus of those teachers’ instruction is the ability to decode words. Even Norah and Hind, who were the only teachers to indicate that reading disabilities include decoding and comprehension problems, did not show any indication for considering comprehension in their reading instruction. It is true that during early grades, the decoding ability accounts for most of the variation of reading performance compared to upper grades, when comprehension gains the upper hand, but explicit instruction on how to construct meaning during early grades is highly recommended for better long-term outcomes. Furthermore, considering that students with reading disabilities have different reading profiles indicates that some students with reading comprehension problems are denied effective and meaningful reading instruction.

Theme 5: Needed legislative, administrative, and instructional support. This theme reflects the content of some patterns that appeared throughout the thematic analysis and were considered very important for explaining why teachers lacked sufficient language knowledge throughout the survey and the interview phases. This

theme is organized into subthemes that reflect teachers asking for changes in preparation and in-service practices, as well as on how students with reading disabilities are determined eligible for special education services.

Regarding teacher preparation programs, teachers indicated that during their undergraduate studies, they were not enrolled in any content-knowledge related courses, including Arabic, Math, or Science. According to Saleh, “during [his] undergrads, [they] did not take any courses about Arabic or mathematics, so [they] do not have the foundations on these subjects.” Hind had a similar experience: “I have not studied anything about phonology, morphology, or syntax during my undergraduate studies.” Thus, “[her] knowledge about phonemic awareness and phonology came from the reading of some articles.” Likewise, Fahad indicated, “[he] only learned about it during [his] graduate studies . . . [when he] took a course that addressed topics such as syllables and morphemic units.” For these teachers, they went to teach after receiving their bachelor’s degree without any prior subject-matter knowledge, including language knowledge. However, Mona, who graduated from a different university than that of the other teachers, reported a different experience:

when I was completing my undergraduate at X university, I noted that we were required to take courses in science, Arabic, and mathematics, in addition to the special education course . . . [also they] provide us with focused training that included teaching us how to use the Saudi digital library to search for best teaching practices . . . other universities like Z and Y universities do not do that.

Undoubtedly, these quotations are not enough to make any conclusion about the role of teacher preparation programs on the discovered lack of familiarity and poor language

knowledge among special education teachers. Furthermore, there is a scarcity of studies on this topic, and the few that addressed this relation reported contradicting results. However, it is just noteworthy to indicate that Mona, who had a positive undergraduate experience, achieved the highest score on the KAMP.

As for the current teacher training, teachers reported dissatisfaction with the content and the scope of the provided workshops. Teachers highlighted the absence of training concerning the Arabic language, and even sometimes refuse to provide such training whenever a teacher asks for it. For example, Fahad indicated that he had “completed more than 30 workshops in the last 10 years, and none was about [the] Arabic language.” According to Hind, “there [are] no workshops about these topics . . . I have not been to any workshop that addresses any of the things that came in your survey . . . I mean phonemic awareness, syllables, or morphology.” Saleh added, “if you can have a look at the content of the provided training, you will find it mostly about assessment and evaluation, [as well as] about policies related to running special education programs.” Norah agrees with Saleh regarding the content of the provided workshops, saying, “most of the workshops they give are about how to run special education programs and how to implement the assessment procedures.” This might be why Theeb thinks that “most of the workshops that [he] attended are of poor quality and waste of [his] time.” Therefore, Theeb noted, “most of us, not just me but others too, use google and social media such as Twitter and YouTube for learning about whatever they need for teaching.” Furthermore, teachers indicated dissatisfaction concerning the trainers, suggesting that they also lack the necessary language knowledge. According to Mona, “the issue with the workshops is

not only that the content is useless, but also the presenters are either the superintendent or a senior teacher . . . why do we have a professor or an expert instead.” Norah also noted, “our superintendents do not know a lot about language knowledge or phonemic awareness.” Hind supported this observation when she suggested, “the reason for why there [are] no workshops about language knowledge might be because those who are in charge [do] not know much about it.”

However, it seems that it is not only the content and scope of the workshop but also its regulations. Mona indicated that she “once asked [her] superintendent to attend a workshop on [the] Arabic language that was provided by the district; [the superintendent] refused, saying that this kind of [workshop] is only for teachers with [a] degree in Arabic.” In contrast with the situation in the public schools, Hind cited a positive experience in a private school where they would have “weekly seminars where translated copies of articles about certain topics are disseminated and discussed among the group.” Hind added, “I really miss these seminars, I learned a lot . . . I do not have the same access now . . . and the workshops are not that good.” Theeb suggested that “as teachers, we really need workshops that address topics about Arabic phonology, morphology, and syntax . . . also we need [experts] such as [linguists] to visit us in our schools and provide us consultations.”

It is clear how teachers are deprived of the necessary training experience to develop and become effective teachers, including meaningful language knowledge related training. Consequently, teachers turned to unreliable and non-evidence-based sources to enhance their knowledge. In addition to using Google, Twitter, and YouTube,

as noted by Theeb, teachers are circulating teaching practices and teaching resources.

One teacher (Hind) reported that she discovered that some of the teaching strategies that she used are used by other teachers differently and sometimes with different names.

However, she indicated that she “learn[s] more from attending other teachers teaching lesson[s] than from any workshop.” Fahad mentioned a similar experience, indicating

that teachers usually deal with students who have similar reading problems; thus, “[he] sees that teachers use similar teaching practices . . . and [he] learned how to teach

students with reading disabilities from those before [him].” Waleed also noted that

“during [his] first years as a teacher, [he] struggled a lot, but through the support [he] received from other teachers [he] developed the confidence and the knowledge to teach [his] students.” This tendency to use other teachers as a source of knowledge is further

evident in Saleh’s suggestion to use Arabic language teachers as a source of knowledge about basic Arabic language elements. Saleh suggested that because “Arabic classroom teachers are supposedly expert on syntax, why do not they team-up with special education teachers

. . . this will help [special education] teachers to improve their language knowledge.”

Teachers provide a valuable source of support, especially for new teachers; this is why practices such as mentorship are highly recommended for helping teachers to adjust to

their new role (Carney et al., 2013; Roberson, 2019; Salter, 2015). However, it is

troubling if teachers rely on each other for improving their content and pedagogical

knowledge instead of receiving their knowledge through reliable and supervised training.

Finally, teachers pointed out that current practices related to eligibility determination of students with reading disabilities are lacking comprehensiveness and trustworthiness. The lack of comprehensiveness is evident from the absence of teamwork. According to Theeb, he is “the only one conducting the evaluation process, and enrolling students into the special education program.” Similarly, for Hind, “do you know who I am working with . . . no one . . . it is only me . . . we do not use assessment teams, like when you have different individuals working together.” Hind added, “when I was working in the private school, I have others working with me and reviewing my work . . . and when I do not understand something, they always give me resources.” Those special education teachers felt isolated and working without any collaboration or support. As Saleh puts it, “well, it is only you, you are the one who receive[s] the referrals, complete[s] the evaluation, and make[s] the decision about the existence of the reading disability.”

The trustworthiness of the evaluation process is another issue. Salman described the process as an “inaccurate evaluation process.” According to Mona, “[they] identify students with learning disabilities by reviewing students’ school files, so students with a history of family or health problems are excluded, the rest are administered a reading test to determine the exitance of reading disabilities.” Thus, Hind thinks that “the current assessments are not for detecting reading disabilities . . . they are more for identifying at-risk students . . . the current reading assessment that I use does not address morphology nor syntax; it is only about letters and words.” Fahad seems to agree with these observations when noting:

I am not satisfied with the way students with reading disabilities are identified . . . there should be some use of the IQ test; I mean we were told in my [undergrad] that we need to [rely] on IQ testing and academic tests . . . however, what I use is [a] handful of reading tests that I can finish with the student in less than one hour.

Therefore, some teachers indicated that they do not trust the outcomes of the evaluation process. Norah, who has 13 students in her classroom, noted that “I am only sure about five of them to really have learning disabilities.” Salman suggested that other teachers are not also sure about their students, as he pointed out: “if you go to a teacher of 12 students with learning disabilities and ask him how many are really students with learning disabilities, he would say to you [maybe] two, the rest I am not sure.” This conclusion was also strengthened by Mona, who pointed out:

most of the time, no one can tell you if the student has dyslexia or not . . . I would spend months teaching some of my students not knowing whether or not they actually have reading disabilities . . . sometimes, I would have 12 students, and I only can guarantee that 4-5 of them are really students with learning disabilities.

Teachers’ lack of pre-services preparation that addresses Arabic language knowledge, as well as lack of meaningful and effective in-service training, are factors that might explain the reported unfamiliarity and poor knowledge of Arabic phonology and morphology. Several studies indicated that teachers need to be introduced to language knowledge and trained on how to include teaching practices that address phonological awareness, morphological knowledge, syntax, and vocabulary (International Dyslexia Association, 2010; NRP, 2000). Furthermore, teachers’ limited knowledge of reading and reading disabilities might be shaped by their instructional experiences. Teachers reported designing reading instruction that targets only decoding, as well as using improper

evaluation practices. Despite being lectured about how students with reading disabilities are identified through a comprehensive evaluation process, which includes using different reliable assessment tools by an IEP team, teachers were faced with the reality of using unreliable evaluation process isolated from any collaboration or support. Teachers' limited and imperfect preparation, training, as well as instructional experiences seemed to be the sources from which they draw their knowledge about language, reading, and reading disabilities, found to be poor and limited.

Conclusion of the Qualitative Phase

The qualitative phase was a follow-up to the quantitative phase. Special education teachers who participated in the quantitative phase were invited to participate in semi-structured interviews. The interviews were limited to the special education teachers for their unique and important experience teaching reading for students with reading disabilities. The participants were eight teachers; three were female, and five were male. The interviews were transcribed and analyzed using a thematic analysis approach. The quality of the data collection and data analysis were ensured through the reporting on four criteria including credibility, transferability, confirmability, and dependability. The findings from the interviews indicate a lack of familiarity with the concepts related to language phonology and language morphology; this might explain the poor knowledge teachers have during the survey and interviews. Furthermore, teachers' sole focus on teaching decoding might explain their limited knowledge about reading and reading disabilities. In these interviews, teachers complained about poor preparation and unmeaningful training, which might be contributing factors to the observed poor

language and reading knowledge. In sum, the qualitative phase provided information that would help to expand on the outcomes generated from the quantitative phase, which is discussed in the following chapter.

Chapter Summary

This chapter presented the findings of this study, organized according to the research questions. The chapter was divided into two main sections; the first section presented the findings of the quantitative study phase, and the second section presented the findings from the qualitative study phase. The quantitative phase of the study was reflected in Research Questions 1, 2, and 3, while the qualitative phase was reflected in Research Question 4.

The findings from this study indicated that special and general education teachers, in general, have poor knowledge of Arabic morphology and phonology, as teachers achieved an average percent of 36.6%. Also, there was no significant difference between the teachers due to their certification type. However, teacher certification type impacted their self-perception of language knowledge; although the majority of teachers rated their language knowledge as average or above average, the GETs rated their morphology and phonology knowledge at significantly higher levels than those of the SETs. Also, teachers with little teaching experience achieved significantly higher scores on the KAMP compared to teachers with average and high teaching experience, indicating that more years of teaching did not lead to better language knowledge. Finally, the findings from the interviews with a group of special education teachers only confirmed that noticed lack of Arabic language knowledge. Teachers noted how they are not fully familiar with the

concepts and aspects of Arabic language knowledge, especially morphology, citing the absence of these topics in their preparation and training programs as a possible contributing factor. Teachers' lack of language knowledge was also evident in their perceptions of reading and reading disabilities.

CHAPTER V

DISCUSSION

This chapter is focused on the discussion of the findings and limitations, as well as the research and practice-related suggestions of this study. The chapter opens with a summary of the study, which restates its purpose and research questions. Then, the findings from the quantitative and qualitative phases are synthesized and organized into sections that better summarize the major takeaways of this study. Other sections are also devoted to discussing the strengths and the limitation of the study, delineating the practical implications, and making suggestions for future research.

Summary of the Study

Saudi Arabia is making an unparalleled investment in the education of its citizens compared to its neighboring countries (Yahia, 2016). Also, Saudi Arabia highlighted providing meaningful education as one of the major goals for its 2030 vision (Saudi Vision 2030, 2016). Despite that, Saudi students continue to show poor performance on reading, mathematics, and science at international tests, such as the Progress in International Reading Literacy Study (PIRLS), the Trends in International Mathematics and Science Study (TIMSS), or the Program for International Students Assessment (PISA). Many factors can be blamed for this unfortunate outcome. However, one crucial factor is providing students with knowledgeable and highly qualified teachers. It is evident from different studies (e.g., Darling-Hammond & Youngs, 2002; McCombes-

Tolis & Feinn, 2008; Piasta et al., 2009) that teacher knowledge and instructional skills are strong predictors of their learning to the extent that receiving instruction by incompetent teachers for even one year leads to long-term adverse impacts on student learning (Reid Lyon & Weiser, 2009). For that, the literature is clear on indicating the importance of teacher competency on content, pedagogical, and content-pedagogical knowledge related to their subject matters. In the case of reading, content knowledge is defined as the knowledge of basic language elements, namely phonology, morphology, syntax, semantics, and pragmatics. Empowered by this belief, several studies targeted teachers' language knowledge across countries, languages, and provisions. Although the literature in this area of research is still emerging, especially as it relates to the impact on student outcomes, the findings from the reviewed studies showed how teachers were performing significantly poorly on items related to defining language terminologies (e.g., R. Cohen et al., 2017; Mather et al., 2001; Spear-Swerling & Brucker, 2003), identifying the number of speech sounds in words (e.g., Moats, 1994; Podhajski et al., 2009), identifying the number of phonemes and syllables in words (e.g., Aro & Björn, 2016; Spear-Swerling & Brucker, 2003), and identifying the number of morphemes in words (e.g., McIntyre & Hellsten, 2004; Podhajski et al., 2009). Other studies found a strong relationship between teachers' levels of language knowledge and their students' reading progress, indicating that better levels of language knowledge correlated with better reading performance (e.g., Lane et al., 2008; McCutchen, Abbott, et al., 2002; Piasta et al., 2009).

Therefore, this dissertation addressed language knowledge (i.e., morphology and phonology) among Saudi early elementary teachers of students with reading disabilities (RDs), including general and special education teachers. To the best of the researcher's knowledge, this was the first study that explored language knowledge among Saudi teachers in early elementary grades. Therefore, there was a need to develop a test for language knowledge, using advanced test development procedures (e.g., translation validity, face validity, content validity, pilot testing, reliability analysis, and items analysis). The outcome was the test for Knowledge of Arabic Morphology and Phonology (KAMP).

This dissertation adopted an explanatory sequential mixed method design, aiming to use the findings from the qualitative phase to help interpret the results of the quantitative phase. Four research questions guided this study. Of those, Research Questions 1 and 3 were quantitative and examined how teachers perform on the KAMP based on their certification type and their levels of teaching experience (Research Questions 1 and 3). Research Question 2 was also a quantitative question that examined how general and special education teachers perceived their knowledge of Arabic morphology and phonology. Research Question 4 was a qualitative question aimed at exploring how teachers describe language knowledge, reading, and reading disabilities, as well as how they describe their methods of teaching reading for students with reading disabilities, aiming to yield information that could help interpret the findings generated from the quantitative phase. Findings from the study's two phases are discussed in the following sections.

Discussion of the Findings

Language Knowledge and Teacher Certification Type

The first research questions aimed at comparing special and general classroom teachers on their performance at the KAMP, examining the impact of the type of certification on the knowledge of Arabic morphology and phonology. This investigation was considered important for the fact that when they are certified to teach, they are examined based on two distinctive teaching standards (see Table 2). While Arabic teachers in general classrooms are not expected to have knowledge of students with reading disabilities, the special education teachers are not expected to have knowledge of basic Arabic language elements. These two types of knowledge are necessary when teaching students with reading disabilities, knowing that they spend the majority of their time in the general classroom.

The findings from this current study indicated that, although the special education teachers (SETs) scored higher than the general classroom teachers (GETs), the mean difference was not statistically significant. This finding contradicts the findings reported in similar studies. The literature indicated that SETs tended to show better language knowledge than GETs. For example, Fielding-Barnsley and Purdie (2005), they surveyed 340 special and general classroom teachers from Australia and reported findings that the SETs outperformed the GETs across all the tested domains.

In general, the special and general education teachers, alike, scored poorly in the KAMP. The majority of SETs and GETs (62.35%) scored 13 or less, which is the equivalent of correctly answering only 30% or less of the KAMP's item. Furthermore, no

teacher was able to answer more than 74% of the KAMP correctly. Teachers failed items that required defining language-related concepts, as well as items that required an application of language knowledge to identify phonemes, morphemes, and syllables in words.

These findings are not surprising. The literature reviewed in this dissertation indicated, repeatedly, how special and general education teachers, pre- and in-service, lack sufficient language knowledge. For example, in Moats (1994), the majority of the SETs and GETs failed tasks related to graphophonemic knowledge, syllable types, morphemic knowledge, and syntactic knowledge. In another study, Moats and Lyon (1996) reported similar findings, with only one-third of the teachers showed positive performance on phonology and morphology tasks. In Mather et al. (2001), pre- and in-service teachers were administered the same language knowledge survey by Moats (1994), showing similar patterns of poor performance, although the in-service teachers scored significantly higher than pre-service. McCutchen, Harry, et al. (2002) also reported similar findings regarding general and special education teachers teaching early elementary grades, showing that teachers' accuracy ranged between 30 and 35% across all the tested language domains.

This lack of language knowledge, among SETs and GETs in this study, was also present in the semi-structured interviews. The concepts special education teachers had about language were limited to only phonology (e.g., letter-sound relationship, short vowels, long vowels, and syllables). Furthermore, when asked to share examples explaining their understanding of language-related concepts, their shared examples

indicated that they are confusing syllabic knowledge with phonemic knowledge, using phonemes and letters as synonyms, or conceptualizing language knowledge to be solely phonemic awareness.

Therefore, findings from the KAMP and the interviews combined indicate unfamiliarity and lack of knowledge in relation to Arabic morphology and phonology, in particular, and the other basic linguistic elements of the Arabic language, including syntax, semantics, and pragmatics. The factors contributing to this unpleasant finding could be numerous. Also, there was no significant difference between the SETs and GETs on their overall language knowledge performance.

Self-Perception of Language Knowledge and Certification Type

Research Question 2 aimed at examining how different the SETs and GETs on the perception of their language knowledge. Two findings are relevant here; the two groups of teachers tended to claim to have high Arabic phonology and morphology knowledge, and that the level of self-perception of knowledge stated by GETs was statistically significant than that stated by the SETs. Related to the first finding, several studies indicated that teachers often tend to overestimate their levels of language knowledge, a claim that was often found to be baseless. Concerning the second finding, it could be that because the certification standards applied to the GETs address aspects of Arabic language knowledge (Table 2), they felt that they are better prepared and knowledgeable enough to address topics of Arabic phonology and Arabic morphology. However, they scored on the KAMP lower than the special education group, although the difference was not statistically significant.

Teachers' self-perception of language knowledge is very critical, because "what the learner believes to know also influences his learning, not only directly but also indirectly by affecting monitoring and regulation of learning" (van Loon, de Bruin, van Gog, & van Merriënboer, 2013, p. 24). If a teacher approaches teaching reading with high and unfounded confidence in their language knowledge, they might be less willing to search for professional development opportunities. Studies that addressed how teachers self-rated their language knowledge reported findings similar to this study. In Cunningham et al. (2004), the majority of teachers self-rated their knowledge of phonics and phonemic awareness as high, at 77.6% and 67%, respectively. However, the average correct response they achieved was very low, 28% in phonics items, and 38% in phonemic awareness items. Also, their scores were not statistically significant from that of the group who self-rated their phonics and phonemic awareness knowledge as low. Similarly, Spear-Swerling et al. (2005) indicated that when a group of 132 teachers was tasked with self-rating their phonics and phonemic awareness knowledge, 41.6% self-rated as having knowledge, and 15% self-rated as having low knowledge; however, evidence from their performance on tasks related to graphophonemic segmentation, syllabic knowledge, and morphemic knowledge, indicated no statistically significant differences between the two groups. Furthermore, the participants' overall performance was below the ceiling level across all the tested domains. A more recent study by Chapman et al. (2018) reported similar findings that the vast majority of teachers rated their knowledge phonology and morphology between moderate and high, although achieving a low overall percentage of 66.5%.

The findings from this study are not that different. In fact, 81.5% of the GETs and 72% of the SETs self-rated their phonology knowledge as average, high, or very high. At the same time, 78.6% of the GETs and 59.3% of the SETs self-rated their morphology knowledge as average, high, or very high. As the findings from the KAMP indicated, the general and special education teachers achieved an overall averaged percent of 36.6%.

Furthermore, in the semi-structured interviews, the special education teachers showed inaccurate self-perception of their phonology knowledge. Although they explicitly indicated the absence of knowledge related to morphology, the majority claimed that they have phonology knowledge. They were confusing phonology with language knowledge and syllables with phonemes, which are indications of wrongly perceived knowledge of Arabic phonology. The findings from the quantitative and the qualitative phases of the current study showed how the general and special education teachers are misled by unfounded belief about their competency on basic Arabic linguistic elements.

Language Knowledge and Level of Teaching Experience

Research Question 3 aimed at measuring the impact of teacher level of teaching experiences, as measured by years of teaching, on the knowledge of Arabic morphology and phonology, among special and general education teachers. Multiple studies targeted the impact of teaching experience on language knowledge. Seemingly, this particular investigation is encouraged by the belief that the more years of teaching experience lead to better language knowledge, due to factors such as more training opportunities, and more familiarity with the teaching of reading (e.g., Alatalo, 2016; Clark et al., 2017;

Mather et al., 2001; Spear-Swerling & Brucker, 2003). The consistent finding across most of the relevant studies is that, although teachers have poor language knowledge, those with higher teaching experience showed significantly better performance (e.g., Jordan et al., 2018; Mather et al., 2001; McIntyre & Hellsten, 2004; Washburn et al., 2011a). In Jordan et al. (2018), when teachers' age, race, and years of teaching experience were examined, only teachers' years of teaching experience was found to be significantly associated with their level of language knowledge, in that teachers with higher teaching years achieved higher performance. Similarly, Washburn et al. (2011a), investigated the language knowledge of pre-service teachers, who had no prior teaching experiences, and in-service teachers, to indicate that the in-service teacher scored significantly better than the pre-service teachers. Furthermore, several other studies reported similar findings, which suggested that in-service teachers scored significantly higher than pre-service teachers (e.g., Aro & Björn, 2016; Goldfus, 2012; Mahar & Richdale, 2008).

In this study, teaching experience was defined by the number of years teaching; thus, teachers were divided into three different groups: little teaching experience (< 5), average teaching experience (5–10), and high teaching experience (> 10). The findings from this study indicated that regardless of the type of certification, teachers with little teaching experience scored significantly higher than teachers with average and high teaching experience. This finding contradicts those reported in the literature regarding the influence of teachers' teaching experience on their language knowledge. The current study indicated that teachers' amount of teaching experience did not lead to

better language knowledge, as the group with fewer number of teaching years scored significantly higher than the groups with an average and a high number of teaching years.

It is possible to draw some speculations interpreting this finding using the information from the qualitative phase. In the semi-structured interviews, the special education teachers pointed out the poor quality of the in-service training, citing factors such as training that is not meaningful, irrelevant, and does not address topics related to Arabic language knowledge. From the literature, the quality of literacy preparation was a critical factor that impacted teachers' language knowledge (e.g., Alatalo, 2016; Spear-Swerling & Brucker, 2003). However, it is worthy to note that the special education teachers in the interviews had years of teaching experience that ranged between 5 and 20, though representing only the groups for average and high teaching experience. It seems that the teachers with little teaching experience had a different type of experience that allowed them to show significantly better performance than their counterparts. It might be relevant here to indicate that it is only recently that SETs and GETs are required to pass a certification exam to become eligible to teach at public schools. Previously, teachers were only required to possess a bachelor's degree in a relevant subject matter. It might be that these certification exams helped to expose the SETs and GETs to topics related to Arabic language knowledge, knowing that some of these exams address some Arabic linguistic elements.

Aside from these speculations, drawn from the interviews and the certification exams, there is no salient reason that explains why SETs and GETs with little teaching experience significantly outperformed teachers with average and high teaching

experience. This observation requires further investigation that takes into consideration not only patterns within current teaching experiences (e.g., differences in training, teaching methods, quality of mentoring and supervision) but also consider changes in the teacher preparation programs.

Hearing Teachers Voices: Why They Lack Sufficient Language Knowledge and How It Is Impacting Their Daily Reading Instruction

The fourth and last research question was addressed using qualitative methods. This question aimed to guide the interview phase of the research in yielding qualitative data that help to explain the findings from the KAMP. In addition to strengthening the conclusion from the KAMP regarding the poor language knowledge among the teachers, the interviews helped to point out that lack of familiarity with these concepts, due to factors related to teacher preparation programs and in-service training. The special education teachers indicated a lack of familiarity with the concepts related to the Arabic language, especially regarding morphology and syntax; in fact, even the absence of semantics and pragmatics in their provided definitions for language knowledge is further evidence. Although the interviewed teachers claimed knowing phonology, the lack of specificity and the mixing of terms are clear indicators of poor language knowledge. During the interviews, teachers indicated how these topics were absent from their teacher preparation programs, and a few indicated that it was only when they started their graduate studies that they were introduced at a surface level to topics about language knowledge. Also, the teachers described current in-service training activities with misalignment to their professional goals, which included acquiring some knowledge of basic Arabic language elements.

The lack of language knowledge appeared, not only during the KAMP, but also within how the special education teacher conceptualized reading and reading disabilities. The interviews showed how special education teachers do not appreciate the permanent role of language knowledge in the development of reading. The teachers limited their definitions of reading to only the ability to decode words and cited only phonemic awareness as the only necessary skill for students to acquire reading. They ignored the roles of morphological awareness, syntactic knowledge, and word meaning, all of which are important for successful reading experiences. Moreover, special education teachers failed to recognize the role of language knowledge in the development of reading disabilities. The literature on reading disabilities predominantly recognizes the role of language knowledge on students' developing reading problems. Some studies indicated that, when the brain structures for students with and without reading disabilities are compared, there were differences in the brain areas related to language processing (e.g., Bailey et al., 2016; Booth & Burman, 2001; Ferstl et al., 2008). Other researchers also showed how reading abilities are shaped by students' linguistic knowledge (Kamhi & Catts, 2011; Mason, 1979; Nation, 2005; Roth et al., 2002). Thus, poor language abilities or insufficient language processing are the main factors contributing to reading disabilities associated with decoding words or deciphering the reading message. However, the special education teachers cited other factors that, although important, are not factors that cause reading disabilities. During the interviews, special education teachers cited a lack of motivation, poor reading instruction, and vision problems. Some studies have reported this misunderstanding of the nature of reading disabilities among

SETs and GETs (Ness & Southall, 2010; Washburn et al., 2014; Washburn et al., 2011a). Related to the current study, teachers lacking understanding of how language knowledge plays a central role in the development of reading and reading disabilities, jointly with the discovered lack of language knowledge, are worrying, especially concerning their reading instruction.

Teacher knowledge and instructional practices are critical for student learning (Hattie, 2008; Reutzel et al., 2011). The interviews indicated that the special education teachers focused on teaching students how to decode words. More specifically, they highlighted how their instruction only targets the knowledge of letter-sound relations, using sounding out activities such as onset-rim, segmentation, and blending. Thus, it seemed that their reading instruction is focused only on the acquisition of phonological knowledge; other important linguistic aspects of Arabic, such as morphology and syntax, as well as word meaning and reading comprehension, are not salient components of their reading instruction. When learning to read, students need to be provided with explicit reading instruction that targets phonemic awareness, fluency, vocabulary, and comprehension (NRP, 2000). Undoubtedly, teachers need to have sufficient language knowledge for them to successfully design reading instruction that addresses these important domains. According to Piasta et al. (2009), when explicit code-based instruction is delivered by teachers with high language knowledge, students make significant reading gains.

Regarding the current study, special and general education teachers alike have low knowledge of basic Arabic language, as well as a limited understanding of how

reading and reading disabilities are developed. Furthermore, it is assumed from the interviews that the reading instruction provided by the special education teachers are of poor quality, since they only address phonemic awareness, although the explicitness of the instruction is unknown. These findings, taken together, are unfortunate and raise concerns about the quality of special education services provided to students with reading disabilities.

Finally, some special education teachers raised concerns about the process whereby students with reading disabilities are identified. Although the RSEIP emphasizes using the discrepancy model for determining the eligibility of students with learning disabilities to special education, the teachers indicated that they do not use this process. Instead, they use only teacher-made reading tests to assess students' reading skills and identify students with reading disabilities accordingly. Furthermore, teachers' comments about how unsure they are about the trustworthiness of the identification process to the point that they believe that most of their students are falsely identified as students with learning disabilities are very troubling and lead to further questioning of the quality of special education services.

Implications of the Study

The findings of this study have several implications. First, teachers' knowledge of Arabic basic linguistic elements should be taken into consideration by policymakers and education providers at the teacher preparation program level, the in-service training level, and the teaching certification level. Unfortunately, the findings from this study showed how SETs and GETs have poor knowledge of Arabic phonology and morphology at the

abstract and application level; furthermore, the follow-up interviews with the special education teachers showed how they are not familiar with this body of knowledge, and how they have limited understanding of the role of language knowledge in reading or the development of reading disabilities. These findings are worrisome when acknowledging the crucial impact of reading teachers on students' reading performance (Piasta et al., 2009; Reid Lyon & Weiser, 2009). In this study, teachers failed to perform tasks related to syllabic knowledge and phonemic awareness, which are central to any successful explicit reading instruction. Therefore, these findings might contribute to explaining why Saudi students are continuing to fall behind on international tests of reading (e.g., PIRLS and PISA). Undoubtedly, this poor performance is a result of a mix of factors, adding different weights to the dilemma. However, teacher quality might be contributing significantly and thus should be placed at the heart of any future educational initiatives designed to change the current reality of lagging behind other countries in reading, math, and science.

Students with reading disabilities are a unique population, who face huge educational and non-educational challenges inside and outside of the school setting. Therefore, they need to receive meaningful and appropriate reading instruction. Special and general education teachers working with students with reading disabilities must adhere to this understanding of reading disabilities as language-related and knowledgeably use explicit code-based reading instruction. Teacher preparation programs, in-service training, and certification exams must too adhere to these facts. The review of the certification standards for special education teachers within this dissertation

indicates a lack of emphasis on Arabic phonology, morphology, syntax, and semantics. The special education teachers also noted during the interviews how they were not familiar with these language elements, neither during the preparation programs nor during their in-service training. There is a need for policy change to include this body of knowledge into our teacher preparation and training programs, as well as certification exams. The literature supports this suggestion, as experimental studies showed that when teachers are provided with targeted training that addresses explicit teaching of these linguistic elements, teachers improved their language knowledge, and students made significant gains in their reading performance.

Limitations of the Study

Regardless of its strengths, this study has some limitations that should be noted. First, the generalizability of the findings of this study is limited to only one Saudi city, the capital city of Riyadh. Although Riyadh has considerable percentages of students with learning disabilities, as well as early elementary general and special education teachers, the findings are still limited for a few reasons. Riyadh is an urban inland city that has its own unique identity, which makes it very different, not only from the rural city, but also from urban coastal cities. Similar to most countries, Saudi Arabia has several urban inland and urban coastal cities. Therefore, for the findings to be generalizable to the overall population of Saudi special and general education teachers, the sampling process should consider ways to include teachers from urban, rural, and coastal cities across Saudi Arabia.

The second limitation is the fact that the interviews in this study included only special education teachers. The reason for this decision was a desire to make the interviews more focused on students with reading disabilities, knowing that special education teachers work exclusively with those students. Therefore, this limitation imposed some restrictions on how the semi-structured interviews were used to interpret the findings from the quantitative phase, which should be taken into consideration by researchers and policymakers when using the findings of this study. For example, although the interviews raised questions about the quality of the teacher preparation and in-service training, it is only related to the special education teachers. These findings cannot be used to explain the discovered low language knowledge among general education teachers.

Recommendations for Future Research

The findings of this study are significant. This was the first study to address the language knowledge among Saudi SETs and GETs of early grade students with RDs. The significance of these findings arises from the fact that the early grades are very important for building strong reading skills, especially in light of the Mathew Effect (Stanovich, 2009). These findings are also significant because Saudi special and general education teachers lack familiarity and essential knowledge of Arabic phonology and morphology—knowledge that is essential for teachers to make a positive impact on their students' reading.

However, more research is still needed. Future research should aim to replicate this study at the methodological and findings levels. The KAMP is a newly designed test

of teacher knowledge of Arabic morphology and phonology. More studies that use an original or modified version of the test, or design new similar tests, are needed to verify or falsify this study's findings and provide more ways to assess teacher language knowledge. Also, this study used interviews with only special education teachers; there are three areas in which future studies can advance.

First is a replication of this study, whereby interviews are conducted with general education teachers to explain why they lack the knowledge of Arabic morphology and phonology, despite completing a bachelor's degree in the Arabic language. It is possible to attribute the lack of knowledge about the basic Arabic language elements to the lack of familiarity with these concepts during teacher preparation and training programs, but only for SETs, as the GETs were not included in the interviews. Thus, future research should expand on examining of language knowledge of special education teachers to include ways of exploring why this population of teachers show poor knowledge, despite receiving teacher preparation oriented toward the Arabic language, the quality of the preparation might be questioned.

In this regard, it should be noted that providing more courses on reading instruction during teacher preparation programs might not be the solution (Clark et al., 2017) if the quality of the content and the instruction is not ensured. Therefore, it is suggested that for future research to incorporate multiple data collection tools, in addition to tests and interviews, specifically observations and document analysis. The use of classroom observations would help to gain direct experience of how special and general education teachers approach the teaching of reading for students with reading disabilities,

aspects of language knowledge addressed in their reading instruction, and relevance of the reading instruction to the needs of students with reading disabilities, as well as the amount of time spent on the explicit teaching of phonemic awareness, morphological awareness, fluency, vocabulary, and comprehension. The document analysis can be used to analyze daily reading lessons, classroom reading assessments, and students' IEPs, because examining the extent to which language knowledge is appreciated and addressed in these documents. Furthermore, document analysis into the content of teacher preparation programs might be helpful in investigating how important it is to provide teachers with knowledge of basic Arabic linguistic elements. It is suggested that more focus should be on the content of relevant courses rather than the quantity of reading- and language-related courses, as using the number of literacy courses to gauge the efficacy of teacher preparation programs seems to be a misleading indicator (e.g., Clark et al., 2017; Mather et al., 2001; Spear-Swerling & Brucker, 2003).

Second, there is a need for experimental studies on teacher language knowledge, to indicate the ingredients for better and effective teacher preparation and in-service training programs. Current studies from English speaking countries showed how providing teachers with targeted and explicit training on language knowledge resulted in a significant increase in teacher knowledge (Gormley & Ruhl, 2007; Jeurissen, 2012) and better student outcomes (Podhajski et al., 2009). Future research might consider examining the impact of providing workshops on language knowledge to in-service teachers, informing current in-service training program about the best ways to address this critical knowledge need. Special education teachers indicated during the interviews

how they are unsatisfied with current training for its lack of focus on topics related to Arabic phonology, morphology, and syntax, as well as for the poor quality of the trainers. Teacher preparation programs would also benefit from studies that point out the best ways to enhance teacher's language knowledge and make it relevant to students learning.

Third, and finally, it appears from the interviews that the process whereby students with reading disabilities are identified is in question. The special education teachers indicated that they must use one set of teacher-made reading tests, in addition to their best judgment, to determine a student's eligibility for special education services. Therefore, they noted that they are not sure if many of their students have true reading disabilities. These findings are worrisome and thus require further investigation. It is suggested that future studies use mixed methods designs to uncover this issue and provide findings that help to improve the quality of our special education services.

Conclusion

Language knowledge is central to reading. Good readers need to have knowledge of the phonological, morphological, and syntactic structures of the language, as well as possessing sufficient vocabulary knowledge and understanding of how language is used in different contexts. Models that explained reading disabilities cited difficulties with language processing, especially at the phonological level, as the main contributing factor. The research is clear in its suggestion that reading teachers play a critical role in helping students acquire reading skills to the extent that receiving instruction by incompetent teachers could result in enduring negative consequences during and after their time in school. The same research suggests that for reading teachers to help students become

successful readers, they need to have sufficient language knowledge themselves. Some studies indicated the strong correlation between teacher language knowledge and student reading progress.

This study used a mixed methods design to examine the knowledge of Arabic phonology and morphology among Saudi special and general education teachers. The quantitative phase included the use of KAMP to assess teachers' language knowledge regarding their type of certification, self-perception of knowledge, and level of teaching experience. The qualitative phase included the use of semi-structured interviews with a group of special education teachers, gathering information that helped to interpret the findings from the survey.

The findings from this study showed that teachers have poor language knowledge of Arabic phonology and morphology. There were no significant differences between SETs and GETs in their performance on the KAMP. Although both groups were unrealistic about their language knowledge, as the majority claimed to have high knowledge, significant differences showed that GETs perceived their knowledge at a level that was significantly higher than that indicated by the SETs. Also, the findings indicated that teachers with little teaching experience scored significantly higher than teachers with average and high teaching experience. The semi-structured interviews indicated that the teachers have little familiarity with the concepts related to language knowledge, citing the absence of such topics from their teacher preparation and in-service training programs. This lack of familiarity with and knowledge about Arabic phonology and morphology also manifested in how the teachers define reading and reading

disabilities. Finally, the interviews pointed out some concerns about the quality of the special education services provided to students with reading disabilities, as evident from the teachers' notes about the lack of proper reading assessment and eligibility determination procedures.

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APPENDIX A

APPROVAL FROM THE SAUDI MINISTRY OF EDUCATION

الرقم : ٦٧٥٦٧
التاريخ : ١٤٤٠ / ٨ / ٢٥
المرفقات :

المملكة العربية السعودية
وزارة التعليم
٢٨٠
الإدارة العامة للتعليم بمنطقة الرياض
إدارة التخطيط والتطوير

وزارة التعليم
Ministry of Education

تسهيل مهمة باحث

الاسم		السجل المدني
راشد فهد راشد القحطاني		١٠٦٠٦٣٢٥٢٦
العام الدراسي	الدرجة العلمية	الجامعة
١٤٤٠/١٤٣٩ هـ	دكتوراه	نورث كارولينا/امريكا
عنوان الدراسة: المعرفة بالتركيب البنائي للكلمة في اللغة العربية ومدى الاعتبار للعوامل الاساسية للقراءة لدى معلمي ومعلمات الصفوف الأولية وبرامج صعوبات التعلم في المملكة العربية السعودية.		
"Saudi early elementary reading teachers of students with reading disabilities: knowledge of Arabic word structure, and instructional consideration of essential reading factors"		
عينة الدراسة : معلم .		
رابط الاداة الكتروني : https://uncg.qualtrics.com/jfe/form/SV_bK2TmQMikVZvx2d		

وفقه الله

المكرم قائد المدرسة

السلام عليكم ورحمة الله وبركاته ، وبعد :

إشارة إلى قرار معالي وزير التعليم رقم ٣٨٧١٧٠٨٠ وتاريخ ١٤٣٨/٥/١٢هـ بشأن تفويض الصلاحيات لمديري التعليم ، وبناءً على قرار سعادة مدير عام التعليم بمنطقة الرياض رقم ٣٨٩٢٠٧٩٣ وتاريخ ١٤٣٨/٦/٢٣هـ بشأن تفويض الصلاحية لإدارة التخطيط والتطوير لتسهيل مهمة الباحثين والباحثات ، وحيث تقدم إلينا الباحث (الموضحة بياناته أعلاه) بطلب إجراء دراسته ، ونظراً لإكمال الأوراق المطلوبة ، نأمل تسهيل مهمته .

مع ملاحظة أن الباحث يتحمل كامل المسؤولية المتعلقة بمختلف جوانب البحث ، ولا يعني سماح الإدارة العامة للتعليم موافقتها بالضرورة على مشكلة البحث أو على الطرق والأساليب المستخدمة في دراستها ومعالجتها. وللمعلومية فإن طلب (إنهاء المهمة) يتطلب الرفع لنا من الجهات المعنية بتطبيق البحث بأن الباحث قد باشر تنفيذ أدوات بحثه حضورياً.

شاكرين لكم وتقبلوا تحياتي..

مدير إدارة التخطيط والتطوير

سعود بن راشد ال عبد اللطيف

APPENDIX B

TEACHER KNOWLEDGE OF ARABIC MORPHOLOGY AND PHONOLOGY
(KAMP)

معرفة المعلمين والمعلمات بالتركيب البنائي الصوتي والصرفي للكلمة في اللغة العربية

توجيهات

يحتوي هذا الاستبيان على بنود متعلقة بالمعرفة التركيب البنائي الصوتي والصرفي للكلمة في اللغة العربية. تم تصميم هذا الاستبيان ليحتوي على ثلاثة أقسام رئيسية وعدة أقسام فرعية. جميع بنود الاستبيان تتبع نظام الاختيارات المتعددة في الإجابة. فضلاً عن ذلك، أقر بنود الاستبيان بعناية وأكملها جميعاً بحسب معرفتك. سوف يتم الاستفادة من الإجابات المُحصلة عليها من الاستبيان لوضع توصيات تساهم في تحسين برامج إعداد المعلمين/المعلمات والخدمات التعليمية المقدمة إلى الطلاب من ذوي وذوات الاحتياجات الخاصة والذين يوجد لديهم صعوبات في مهارات القراءة.

Directions

This survey contains items related to knowledge of Arabic Phonology and Morphology (KAMP). This survey is designed to have three main sections and related sub-sections. All the items in this survey are multiple-choice. Please read through the survey items carefully and complete all the items to the best of your knowledge. Responses from this survey will inform recommendations for improving areas of teacher preparation programs and educational services provided to students with reading difficulties.

القسم الأول

Section A

البيانات الشخصية

Background and Personal Information (BPI)

معلومات عامة

General Information

لكل بند من البنود التالية، اختر الخيارات التي تصف وضعك بشكل صحيح:

For each of the following items, select the appropriate options that best describe you.

نوع او مجال الاختصاص التدريسي Specialization	مدرس فصل عام General Classroom Teacher		مدرس تربية خاصة Special Education Teacher
الجنس Gender	ذكر Male		أنثى Female
أعلى مؤهل دراسي تم الحصول عليه Highest Educational Degree	بكالوريوس Bachelor	ماجستير Master	دكتوراه Doctorate
سنوات الخبرة في التدريس Years of Teaching Experience	<5 (اقل من ٥ سنوات)	5 – 10 ٥ – ١٠ سنوات	More than 10 أكثر من ١٠ سنوات

أثق بأن ما لدي من معلومات ومهارات كافي لجعلي قادراً على تلبية الاحتياجات التعليمية للطلاب أو الطالبات ممن لديهم صعوبات في القراءة I feel very confident with my knowledge and skills to address the instructional needs of students with reading disabilities	لا أوافق بشدة Strongly Disagree	لا أوافق Disagree	محايد Neutral	موافق Agree	أوافق بشدة Strongly Agree
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مستوى المعرفة باللغة العربية المتخيل لدى المعلمين/ات

Teachers' Perceived Language Knowledge

سيُطلب منك في هذا الاستبيان أداء بعض المهام اللغوية التي تشمل معرفة عدد الوحدات الصوتية والوحدات الصرفية والمقاطع الصوتية التي تتركب منها الكلمة، فيما يلي قيم مستوى المعرفة الذي تظن أنك على دراية به بالنسبة للمواضيع التالية:

Throughout the survey you will be asked to perform some language-related tasks that require you to count phonemes, morphemes, and syllables in words; For now, rate how you perceive your knowledge in relation to the following:

	معرفة منعدمة No Knowledge	معرفة قليلة Little Knowledge	معرفة متوسطة Average Knowledge	معرفة كبيرة High Knowledge	معرفة كبيرة جداً Very High Knowledge
علم الأصوات في اللغة العربية Phonology Knowledge	1	2	3	4	5
علم الصرف في اللغة العربية Morphology Knowledge	1	2	3	4	5

القسم الثاني
Section B

المعرفة بالمفاهيم اللغوية الأساسية للغة العربية
Knowledge of Basic Arabic Language Concepts

أولاً: معلومات عامة

اختر الإجابة الصحيحة لكل من الأسئلة التالية:

1. General Knowledge

Respond to the following questions by choosing the appropriate option.

1. Phonemic awareness is:

- a) the ability to derive meaning from a word
- b) the ability to recognize and manipulate the individual sounds in spoken language.
- c) the ability to use sound-symbol (phoneme-grapheme) correspondences to read and spell new words.
- d) Both b and c

١- الوعي الصوتي يقصد به:

أ- القدرة على استنباط المعنى من الكلمة

ب- القدرة على التعرف على الأصوات الفردية في اللغة المنطوقة وإعادة تشكيلها

ج- القدرة على قراءة وتهجئة الكلمات من خلال معرفة أسم ورسم كل حرف من الحروف الهجائية

د- كلا الخيارين (الأول) و (الثالث)

2. A phoneme is:

- a) a single letter
- b) a single speech of sound
- c) a single unit of meaning
- d) a single word

٢- الوحدة الصوتية يقصد بها:

أ- حرف هجائي واحد

ب- أصغر جزء صوتي في الكلمة

ج- وحدة لغوية ذات معنى

د- كلمة واحدة

3. A morpheme is:

- a) a single letter
- b) a single speech of sound
- c) The smallest unit of meaning
- d) a word that has several different meanings

٣- الوحدة الصرفية يقصد بها:

أ- حرف هجائي واحد

ب- أصغر جزء صوتي في الكلمة

ج- أصغر وحدة لغوية ذات معنى

د- كلمة ذات معاني مختلفة

ثانياً: المعرفة بعلم الصوتيات

Phonology

التفريق بين الأصوات المجهورة والأصوات المهموسة

Identifying Voiced and Voiceless Sounds

لكل من المجموعات التالية، حدد الوحدة الصوتية التي لا تنتمي للمجموعة:

For each of the following items identify the phoneme (sound) that does not belong in the group

4	كل ما يلي تصدر أصوات مهموسة ما عدا All the following are voiceless sounds except	ت t	ث θ	س s	ج dʒ
5	كل ما يلي تصدر أصوات مجهورة ما عدا All the following are voiced sounds except	ب b	ت t	ل l	م m

مهارة تجزئة الوحدات الصوتية في الكلمة

Phoneme Segmentation Task

أ- لكل مما يلي، حدد عدد الوحدات الصوتية في كل كلمة (ملاحظة: الوحدات الصوتية يقصد بها مجموع الأصوات التي تتركب منها الكلمة)

- a. For each of the following words, identify the number of phonemes. (Hint: words are made up of sounds).

6	سِرْ sir	3	4	5	6
7	كَتَبَ Kataba	3	4	5	6
8	بَيْتُ Bajtu	3	4	5	6
9	مَسْجِدُ Masdʒid	3	4	5	6
10	نَارُ Naa:r	3	4	5	6

ب- لكل مما يلي، اختر الكلمة التي تحتوي على العدد المحدد من الوحدات الصوتية (ملاحظة: الوحدات الصوتية يقصد بها مجموع الأصوات التي تتركب منها الكلمة)

- b. For each of the following items, identify the word that has the specified number of phonemes (sounds). (words are made up of sounds).

11	كلمة ذات ست وحدات صوتية A word with six phonemes is	قِرْدُ qird	شَرَبَ ʃaraba	سَلَبَ Salb	سَيَّفَ Sajf
12	كلمة ذات أربع وحدات صوتية A word with four phonemes is	لَقِيْتُ Laqii:tʃ	نُبِلَ Nubl	نَهَرَ Nahrūn	شَارَعَ ʃāa:riʃ
13	كلمة ذات خمس وحدات صوتية A word with five phonemes is	كُتِبَ Kutub	طَاوَلَهُ tʃaa:wilah	لَقِمَهُ Luqmah	رُمَحَكَ Rumħuk
14	كلمة ذات سبع وحدات صوتية A word with seven phonemes is	رَفَعَهُ Rifʃah	هِنْدَامَ Hindaa:m	مَنْزَلَ Manzilun	غَرَامَ yaraa:m

15	كلمة ذات ثلاث وحدات صوتية A word with three phonemes is	شُرْطَة furtʕah	قَلَم qalam	بُر Bur	زَعِيم zaʕii:m
16	كلمة ذات ثلاث وحدات صوتية A word with three phonemes is	سُم Sum	هِنْد Hind	بُرْج Burdʒ	طَرَد tʕarada

مهارة عد المقاطع الصوتية

Syllabic Counting Task

أ- لكل مما يلي، حدد عدد المقاطع الصوتية في الكلمات الآتية (ملاحظة: المقطع الصوتي الواحد يتكون من وحدتين صوتيتين فأكثر)

- a. For each of the following words, identify the correct number of syllables.
b. (Hint: the syllable is made of multiple phonemes)

17	Fii: في	1	2	3	4
18	Kataba كَتَبَ	1	2	3	4
19	Sajaratun سَيَّارَة	1	2	3	4
20	Baa:bun بَابُ	1	2	3	4
21	Naa:furah نَافُورَة	1	2	3	4
22	Hindun هِنْدُ	1	2	3	4

ب- لكل مما يلي، اختر الكلمة التي تحوي على العدد المحدد من المقاطع الصوتية (ملاحظة: المقطع الصوتي الواحد يتكون من وحدتين صوتيتين فأكثر)

- c. For each of the following items, identify the word that has the specified number of syllables. (Hint: the syllable is made of multiple phonemes)

23	كلمة تتكون من مقطعين صوتيين A word with two syllables is	سِرْ Sir	دَرْبْ Darb	عَابْ ʕaa:bā	سُلَمْ Sulamun
24	كلمة تتكون من مقطع صوتي واحد A word with one syllable is	هِنْدُ Hind	قِرْدُ qirdun	نَبْعْ nabʕun	هَرَبْ Harab
25	كلمة تتكون من أربع مقاطع صوتية A word with four syllables is	عِطْلَة ʕitʕlah	رَحْلَة Rihlatun	مَقْبَرَة maqbarah	مَغْسَلَة Maysalatun
26	كلمة تتكون من ثلاث مقاطع صوتية A word with three syllables is	جَرَسْ dʒaras	هِنْدَامْ Hindam	لَهِيْبْ Lahii:b	جَوَالْ Jawaa:lun
27	كلمة تتكون من خمس مقاطع صوتية A word with five syllables is	الرَّمَايَة Arimaa:jatu	سَمَاعَة Samaa:ʕh	تَشْرِيفْ Taʕrii:f	نَهَايَة Nihaa:jah

	A word with five syllables is				
28	كلمة تتكون من مقطع صوتي واحد A word with one syllable is	عَلِمَ ʕilm	عَلِمَ ʕalamun	شَرَّ ʕarun	قَصَّرَ qasʕrun

القسم الثالث

Section C

ثالثاً: المعرفة بعلم الصرف

Morphology Knowledge

مهارة عد المقاطع الصرفية في الكلمة الى وحدات صرفية

Morpheme Counting Task

أ- لكل مما يلي، حدد عدد الوحدات الصرفية في الكلمات التالية (ملاحظة: الوحدة الصرفية قد تكون حرف وقد تكون كلمة)

a) For each of the following words, identify the number of morphemes. (Hint: the morpheme unite could come as a letter or as a whole word)

29	كَتَبَ Kataba	1	2	3	4
30	مَكْتَبَ Maktab	1	2	3	4
31	النَّافِذَةُ Alnaa:fiḍah	1	2	3	4
32	المُهَنْدِسَةُ Almuhandisah	1	2	3	4

مهارة مقارنة التركيب الصرفي للكلمات

Morpheme-based Matching Task

ب- لكل مما يلي، حدد الكلمات التي لها نفس العدد من الوحدات الصرفية للكلمة المعطاة مستخدماً قائمة الخيارات: ملاحظة: الوحدة الصرفية قد تكون حرف وقد تكون كلمة)

b) For each of the following words, identify the word/s the has the same number of morphemes from the word options available: (Hint: the morpheme unite could come as a letter or as a whole word)

33	عدد الوحدات الصرفية في كلمة (هَرَبَ) مساو لعدد الوحدات الصرفية في The number of the morphemes in (Harab) is equal to the number of morphemes in	القَلَمُ alqalam	كِتَابُ Kitaa:b	المُعَلِّمُ almuʕalim
34	عدد الوحدات الصرفية في كلمة (الْبَيْتُ) مساو لعدد الوحدات الصرفية في The number of the morphemes in (albaytu) is equal to the number of morphemes in	مُعَلِّمَةٌ muʕalimah	رَجُلٌ rajul	طَالِبٌ tʕaa:lib
35	عدد الوحدات الصرفية في كلمة (المُعَلِّمَةُ) مساو لعدد الوحدات الصرفية في	يَكْتُبُ jaktub	عِنْوَانُكَ ʕinwaa:nuk	تَصَالَحُوا tasʕaa:lahu

	The number of the morphemes in (almuṣalimah) is equal to the number of morphemes in			
36	عدد الوحدات الصرفية في كلمة (طَالِبَة) مساو لعدد الوحدات الصرفية في The number of the morphemes in (taa:lībāh) is equal to the number of morphemes in	الْفَتَاتَان alfataa:taa:n	الْفَرِيقَانُ alfarii:gaa:n	الْجَهْلُ aldzahlu
37	عدد الوحدات الصرفية في كلمة (السَّمَاعَة) مساو لعدد الوحدات الصرفية في The number of the morphemes in (alsamaa:ṣatū) is equal to the number of morphemes in	يَا ابْنِي jaa:ʔbni	مِحْفَظَةٌ mihfaḌatun	النَّهْرُ alnahru

APPENDIX C

INTERVIEW GUIDING PROTOCOL

Interview Guiding Protocol

1. As a start, tell me about yourself (e.g., years teaching, educational degrees)
2. How do you define reading?
3. How do you define language knowledge?
4. How would you explain that some students are struggling with reading, or get identified with specific reading disabilities?
5. Tell me about a typical reading lesson. How do you make decisions about the content and scope of your reading instruction?
6. Share some specific examples of teaching practice that you use to address the reading needs of struggling readers or students with reading disabilities?
7. Do you think students' language knowledge has a role to play in the reading process? If so, how?
8. How does your knowledge of language impact your (thinking about) teaching students with reading disabilities?

APPENDIX D

CONSONANTS AND VOWELS

Consonants		
Arabic letter	Transliteration Upper and lower case	Corresponding Phoneme symbol with alternatives
ب	B, b	/b/
ت	T, t	/t/
ث	Th, th	/θ/
ج	J, j	/dʒ/
ح	H, h.	/h/
خ	Kh, kh	/x, χ/
د	D, d	/d/
ذ	Dh, dh	/ð/
ر	R, r	/r/
ز	Z, z	/z/
س	S, s	/s/
ش	Š, š	/ʃ/
ص	S., ṣ	/sʕ, ṣ, S/
ض	D., ḍ	/dʕ, ḍ, D/
ط	T., t.	/tʕ, t., T/
ظ	Z., z.	/ðʕ, ð, Ð/
ع	‘	/ʕ/
غ	Gh, gh	/ɣ, ʁ/
ف	F, f	/f/
ق	Q, q	/q/
ك	K, k	/k/
ل	L, l	/l/
م	M, m	/m/
ن	N, n	/n/
ه	H, h	/h/
و	W, w	/w/
ي	Y, y	/j/
ء	‘	/ʔ/

Vowels		
Arabic letter/ vowel mark	Transliteration Upper and lower case	Corresponding Phoneme symbol
اَ	A, a; Ā, ā	/a/; /a:/
يَ	I, i; Ī, ī	/i/; /i:/
وُ	U, u; Ū, ū	/u/; /u:/
Diphthongs are transliterated ⟨ay, aw⟩ and transcribed /aj, aw/		